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*A Restoration of the Mausoleum at Halicarnassus.**

BY MR. J. J. STEVENSON, F.S.A.

PLINY'S description of the Mausoleum at Halicarnassus—the tomb which Artemisia his wife (and sister) built for Mausolus king of Caria—has been to architects and archæologists what the discovery of the North Pole has been to sailors and geographers—a problem which successive generations have tried to solve.

Sir Christopher Wren tried his hand. His son, in the "Parentalia," gives his father's description of his design, but adds, "The plate of the above is omitted on account of the drawing being unfinished."

"The sepulchre of Mausolus," Wren says, "is so well described by Pliny that I have attempted to design it accordingly, and also very open, conformable to the description in Martial—

'Aëre vacuo pendentia mausolea,'

and yet not wanting the solidity of the Doric order. The architects living before the time of Alexander, which was before the Ionic order was first in use, I conclude this work must be the exactest form of the Doric."

Wren bases his design on the proportions of the Doric order. The lowest part consists of columns, with statues 7 ft. high on the cornice; on the sixteen inner columns rose the Pteron, consisting of a pedestal 20 ft. high, pilasters of 24 ft. with a cornice of 6 ft., and a stone covering of 24 ft., the steps being 12 in. high and 6 in. 'saile.' "I have omitted," he says, "The triglyphs in the frieze, which I take to be the only place for the inscription, and monuments never were without." . . .

"There might be round upon the first order twenty statues, sixteen more below upon the solids in niches, and twelve in niches of the Pteron, in all forty-eight, each statuary taking twelve."

It is a pity the son did not give his father's drawing, even though unfinished. We may be sure it was a noble architectural conception, and quite practicable to build. It would be an interesting puzzle for a young architect to try to draw it out, but he would have to take for his material not the Greek remains as we have them, but the Renaissance architecture of Sir Christopher's own day. It is curious to note his unconsciousness of any difference between Greek and Roman architecture, or that his style was not the same as both.

Hawksmoor, Wren's pupil, in his church of St. George, Bloomsbury, built about 1750, reproduced what he thought was the pyramid of the Mausoleum, in its steeple rising in steep steps, supporting on its apex George II. as St. George, instead of the chariot of Mausolus.

The height to the top of the statue is 146 ft., which, if he took a larger foot than ours, like the Roman foot, might represent Pliny's 140 ft. for the height; and it has twenty-four steps, as Pliny says the Mausoleum had, but of various heights. The statue is fairly seen, even in the atmosphere of Bloomsbury; in the pure air of Caria every detail of the quadriga which crowned it would be clearly seen.

PROFESSOR COCKERELL'S RESTORATION OF THE MAUSOLEUM.

Professor Cockerell, before the remains of the Mausoleum were brought to the British Museum, designed a restoration, modified in some respects when he saw these; but not so as to make them a part of his design. Mr. A. S. Murray has kindly lent me a photograph of it, which is here reproduced (see lithograph plate). It is beautiful and interesting, the work of one who, like no other, knew Greek Architecture, practical and stable; but the remains of the building which we possess prove it impossible. The roof is a steep pyramid like some roofs of tombs represented on ancient coins, but we know from the remains its pitch was low; it is higher than Pliny's measurements allow, though it has only twenty steps instead of twenty-four. His angle columns are square, not circular, as we know they were from a corner capital we have. It has an attic above the order for which Pliny gives no authority, and it hardly professes to embody his measurements. For this and other reasons, however excellent as a design, it cannot be accepted as a restoration of the Mausoleum.

Cockerell's design, as regards the arrangement of the thirty-six columns, which Pliny says surrounded the building, was adopted and modified by Mr. Watkiss Lloyd ("Archæologische Zeitung," iii. 81), and by Mr. Edward Falkner in 1851 ("Museum of Classical Antiquities," i. 157). In their design the columns are arranged in two rows round a small central cella measuring 22 ft. outside and 14 ft. inside; but all these restorations give an area too small to support a pyramid of twenty-four flat steps of the width which Sir Charles Newton discovered, and consequently have been abandoned.

PULLAN AND NEWTON'S RESTORATION.

Sir Charles Newton, in his account of his discovery of the Mausoleum, adopted as its probable restoration a design suggested first by Lieutenant Smith, and carried out by Mr. Pullan, who accompanied the expedition as engineer and architect.

The "motive" of this design is the size of the steps of the pyramidal roof. These are so flat and low that it requires a much larger building for twenty-four of them (the number Pliny says there were) to cover than Cockerell, taking Pliny's dimensions for the size of the building, had supposed. The thirty-six columns have therefore to be placed in a single row round the building instead of in two rows as in previous restorations.

This design is founded on irrefragable evidence, namely, the steps of the pyramid which Newton discovered. Its authors have constructed the whole building from these, as Professor Owen used to construct a whole animal from a single bone. But that implied a knowledge of the form and construction of animals, and this design shows no corresponding knowledge in the restorers of the construction and form of Greek buildings. To get in the twenty-four steps which Pliny says formed the pyramid they must widen the base from which they rise, so they make *the central chamber* the "Pteron," putting the thirty-six columns in a single row outside it, getting thus the wider base required for the pyramid.

The designs of the restorers thus divide themselves into two classes, which we may call the Newtonite and the Pre-Newtonite. Till Newton's discovery of the flat steps of the pyramid all the restorers understood Pliny's words to mean that the pyramid rose from a base of 63 ft. on the sides by something less on the fronts.

I shall attempt to show that Newton's discovery does not make it necessary to

* Being portions of a paper, showing its main argument, read before the Society of Antiquaries of London on May 7, 1896.

widen the base of the pyramid as the Newtonites suppose, and that a restoration on Pre-Newtonite lines is not only possible but that it reconciles the apparently conflicting statements as to the dimensions of the building of Pliny and Hyginus, and finds suitable positions for the remains of the building now in the British Museum.

But first we shall consider the principal Newtonite designs.

The restoration of Lieutenant Smith and Mr. Pullan, which Sir Charles Newton adopted and published in his book on the mausoleum, is not, I think, now accepted by any one. It is not a beautiful building. The platform for the quadriga is too large, not a pedestal for a group of statuary, as Cockerell knew it must be, but a place almost large enough to turn the chariot round in and exercise the horses. It places an odd number of columns on every side, contrary to Greek practice, which placed an even number on the fronts, thus giving an opening in their centres. The high, ungainly base necessary to get the height of 140 ft., making the columns placed on it, which were the main feature of the building, insignificant in comparison, and raising the frieze, which Pliny says gave the monument its fame, so high as to be invisible without opera-glasses; and the great flat roof concealing half of the quadriga from view, cannot have been the proportions of a building whose beauty made it one of the wonders of the world. We feel that the authors must have made a mistake somehow; that, whatever the building was like, it could not have been like that. Notwithstanding Sir Charles Newton's answers to the obvious objections which have been made to this restoration, it has not been accepted as solving the problem.

MR. FERGUSSON'S RESTORATION.

Mr. Fergusson, to whom all students of architecture are indebted for the important service he has rendered in his History of Architecture, rejecting Newton's restoration, makes one of his own in an essay published in 1862—"The Mausoleum at Halicarnassus restored in conformity with the recently-discovered Remains." He discusses the written authorities and the remains in the museum, and gives plates of a suggested restoration founded on a scheme of ratios. It was inevitable that Mr. Fergusson should try his hand at it, and perhaps it was also inevitable that he should advise how, in one respect, the architects might have made it better than we know from the remains in the Museum that they did. "As I first restored the building," he says, "I placed a square anta in the angles with pilasters on each face, as are found in the angles of the Erechtheum at Athens. I had overlooked the fact that a capital was found with an angular volute, which settles the question, but I still think that, architecturally, the square pier arrangement would have been the best" (page 25).

"After trying several others," he says, "the solution appears to me to lie with the hypothesis that the angle columns were coupled, or, in other words, half an intercolumniation (5 ft. 3 in.) apart from centre to centre."

Should it be asked if there are any other examples of this arrangement the answer must probably be that there are not, but there is also no other building which from its design would so much require strengthening at the angles. Mr. Fergusson here takes for granted that its design was his design for it. It is on the same lines as Smith's and Pullan's, with the thirty-six columns in a single row, a column in the centre of each front, but the lower story open, divided by square columns, instead of their solid wall; and for the meta a low pedestal on which the quadriga rests, as in Newton's restoration of the Lion tomb at Cnidus.

It is an original design of his own. I do not know that it can be disproved by Pliny's account or by the remains, but it has somehow a singularly modern look, suggesting a Town Hall with the municipal offices on the ground floor, rather than a tomb. It does not carry conviction, and has not, I think, been accepted as the solution of the problem.

The latest attempt at a restoration is by Mr. Edmund Oldfield in papers read to the Society of Antiquaries on June 15th and 22nd, 1893, and June 21, 1894, and printed with illustrations in the fourth volume of the second series of "Archæologia."*

His design is characterised by great research and knowledge of the authorities. He gives reasons for rejecting previous solutions, and invites criticism on his own, especially on its architectural details, as he claims that he is not an architect, and has not had any professional advice in preparing it. I therefore venture to attempt to point out where I think his solution fails, and to suggest another which seems to fulfil the necessary conditions. In making this attempt I have been under a great obligation to the information given in Mr. Oldfield's papers. He has collected all the accounts of the Mausoleum in old writers, discussing the various readings and emendations of their text; and he gives drawings and descriptions of previous restorations and of other ancient tombs which may have resembled the Mausoleum, and may therefore give hints for its restoration.

He founds one main part of his restoration on a word in Pliny's description, where, after mentioning the four sculptors of the frieze, Pliny continues:—"Accessit et quintus artifex"—there came in also a fifth artist—"namque supra pteron pyramis altitudine inferiorem æquavit viginti quatuor gradibus in metæ cacumen se contrahens," which he translates "For above the pteron a pyramid equalled the lower pyramid in height," not "æquat," he observes, "in the present tense, like the rest of the sentence, but 'æquavit' in the præterite." That means, he says, this fifth artist "found the roof a complete pyramid of twenty-four steps, pointed like a meta; but he wished to crown it with a quadriga, and this could not be placed on a meta's point. He therefore, as I believe, truncated the pyramid sufficiently to make a platform for his quadriga. Henceforth the pyramid no longer equalled in height the pyramid in the lower part of the building, and no longer had twenty-four steps; but on the new or truncated summit or platform thus obtained, he placed the quadriga, which was still standing in Pliny's day, and which is therefore mentioned by him in the present tense. 'In summa est quadriga marmorea quam fecit Pythis,' bringing the total height of the monument to 140 ft. The reason why for the first and only time throughout his description of the building Pliny used the præterite tense is because for the first and only time he was mentioning a feature which no longer existed in the same form when he wrote." But the reading "æquavit" is not certain. Sillig, whose text of Pliny was considered better than previous ones, prefers "æquat"; and Detlefsen, whose edition (Berlin, 1871) is now considered the best text of Pliny, also reads "æquat" in this passage. One scholar suggests that this various reading may have arisen from the copyist having added to "equat" the first letters of the word "viginti" which follows it—a not unlikely mistake in copying manuscripts where the division between the words is not always distinctly marked. Mr. Oldfield's preference for "æquavit" in contradiction to these testimonies seems unauthorised, and, regarded from a mere builder's point of view, the alteration in the construction of the pyramid which he suggests involves considerable practical difficulties.

Artemisia died two years after Mausolus, before the sculptors had finished the friezes; but they did not withdraw, Pliny says, but completed them, as a monument to the glory of themselves and of art. They gave only the cost of their labour; for these friezes, which we have in the Museum, are carved on slabs of marble independent of the structure, and they may have been carved on the ground, and inserted after the structure was finished.

But the alteration which Mr. Oldfield suggests would be serious and costly. It must have been made either while Artemisia lived, or after her death, when, if Pliny's praise of the self-sacrifice of the sculptors is justified, there was no one to pay for it. Besides the cost of the four colossal horses of the chariot and of the statues, there is the cost of raising them to their position on the apex, and altering the building to receive them after it had been finished. If Pythis paid for this, he would have deserved mention for his generosity, more than the sculptors. Or the alterations may have been made in the two years of Artemisia's life, while the building was going on, and the scaffolding was there. But in this case why should Pliny describe to his contemporaries, centuries after, this feature of the building—the pyramid ending in a point—which had been destroyed, and could not have existed for more than a few months.

And surely the crowning feature of the structure would be designed from the first. Its support must have been prepared for from the foundations. The theory of alteration seems too heavy a weight to hang on the slender thread of a more than doubtful reading in a tenth-century manuscript.

Another distinctive feature of Mr. Oldfield's restoration is founded on the same passage in Pliny's description — viz., "Namque supra pteron pyramis altitudine inferiorem æquavit, viginti quatuor gradibus in metæ cacumen se contrahens," "in summo est quadriga marmorea quam fecit Pythis," which Mr. Oldfield translates: "Above the pteron a pyramid equalled in height the one below, contracting itself by twenty-four steps into the summit of a meta. On the top is a marble quadriga which Pythis made." Mr. Oldfield makes this lower pyramid a flight of twelve steep steps, forming the base on which the monument

* A description and part criticism of Mr. Oldfield's design was published in the *Builder* of February 22 of this year, with a plan, half section, and half elevation.—Ed.

stands. Steps form the base of many Greek buildings, though these are steeper and more in number than usual, but they can hardly be called a pyramid, or even a truncated pyramid, as the word has been usually understood. The reading is doubtful. It is possible, some editors think probable, that instead of "altitudine" we may read "altitudin*em*," as in some manuscripts, the final "m" having been dropped by some copyist, as might easily happen, the final "m" in a word being sometimes not written, but indicated by a stroke over the letter before it. Sir C. Newton (page 192) considers, for these and other reasons, the reading "altitudinem" preferable. This reading, I shall endeavour to show, gives a more reasonable architectural result, which I submit, since there is a doubt, is a point in its favour.

Mr. Oldfield's restoration is interesting and ingenious; the result is a handsome and dignified building which hardly needs the apology he makes that he is not an architect; but if I can show that the discovery of the broad flat steps of the pyramid, which is the motive of all the designs I have called Newtonite, does not necessitate a larger base for the pyramid roof than Cockerell and the other pre-Newtonite restorers supposed, I think Mr. Oldfield might be willing to reconsider the "motive" of his restoration.

It may seem presumptuous in me, when so many better men have failed, to make a new attempt to prove what the Mausoleum was like; but it seems to me rather an architectural problem than one of the interpretation of texts, and since the attempts of Wren and Hawksmoor and Cockerell, none of whom had the remains which Newton discovered to guide them, no architect, so far as I know except Mr. Pullan, has tried to solve it. Without Pliny's description and dimensions no restoration would have been possible; the fragments in the Museum would be little better than a heap of quarry stones; we could not tell how to put them together.

No restoration of the Mausoleum can, I think, be accepted unless it embodies the remains of it in the Museum in accordance with Pliny's description and dimensions, and with the other notices, ancient and more modern, which have come down to us. I believe that by simply accepting and following these, and guided by architectural and constructional considerations, but without altering or ignoring them to suit our theories, the problem of what the Mausoleum in its main features was like can approximately be solved.

I first became interested in the question when one afternoon, while Mr. A. S. Murray was arranging the marbles in the Museum, he asked me whether, seeing that the gallery was not high enough to set up the whole Order complete, he should cut off its head or its legs—should shorten the column or, leaving it complete, place the entablature which it supports separately. I suggested that as the architecture of the Mausoleum was more interesting and valuable than that of the Government Board of Works, a part of the roof of the gallery should be raised so that height should be got to show the proportions of the whole Order. This would have raised the cornice and frieze up into the light out of the shadow of the heavy beams of the gallery roof, where they could have had the full light of the sky. But it would have involved cost and delay, and the Board of Works' Architect would not hear of his building being injured. In this case, and in the destruction of the Rolls Chapel to avoid altering the arrangements of the new Record Office, I think the Architect of the Board of Works shows too high an estimate of the merit and value of his own designs.

I think that when a nation becomes the possessor of a treasure like this she ought to feel bound to expend the necessary sum (which in this case would have been a hundred pounds or two) in showing it as it is. A cast of the Order has been made for the Museum at Edinburgh, which, fortunately, is high enough to allow the parts to be placed in their true relation to each other.*

STREET LIGHTING.

THE problem of the lighting of our streets in the best possible manner is one that is deserving of more serious attention than it generally receives. The numerous recent improvements both in sources of light and diffusing globes enable us to obtain brilliant street lighting at even less cost than the dingy lighting of twenty years ago. The public has a hazy notion that, by using the electric arc, far more light is obtained than when gas lamps are used, at no extra cost. When they find out from the Corporation accounts that street lighting by electricity is more expensive, they begin to think that they must have been mistaken, forgetting that in this case the extra cost is due to the far higher standard of lighting demanded. The choice of injudicious globes which cut off 40 or 50 per cent. of the total light generated is often also responsible for the increased expense. The financial aspect we shall not consider in this paper, contenting ourselves with the problem of how best to illuminate our streets. In practice, of course, each street has to be considered on its own merits, but there are a few general considerations which ought always to be borne in mind.

One of the first points that has to be considered is whether the horizontal illumination—that is, the illumination of the ground—or the vertical illumination—that is, the illumination of passers-by and vehicles—is the more important. In the early days of arc-lamp lighting the securing of a uniform horizontal illumination was what was aimed at. This was approximately obtained by placing powerful arc lamps at great heights from the ground. As an ordinary arc lamp gives out very little light vertically downwards, and nearly all its light between angles of 20 and 70 deg. with the vertical it is specially suitable for obtaining a uniform ground illumination. The great drawback to this method of lighting was the absorption of the light by the atmosphere, the slightest haze or fog absorbing most of the rays. The importance of this effect was not realised at first, but practical experience soon proved the necessity of lowering the lamps. This was a fatal objection to the various schemes for lighting towns by a series of lofty light-houses which have from time to time been proposed.

Incandescent gas burners give out their light in quite a different way to arc lamps. Most of their light is given out horizontally, the candle power at 45 deg. being only one-third of what it is horizontally. Hence the vertical illumination produced by these burners is very good when they are not placed too high up. The perspective effect produced by a row of Wellsbach lamps is distinctly good, as they are visible a long way off. With alternating current arc lamps, with the usual large shades fixed over them, this perspective effect is almost entirely lost, which greatly detracts from their appearance in a long street. Until, however, stronger mantles are invented, incandescent gas lamps are unsuitable for street lighting. After three months' experience at Leamington, they were discontinued, owing to the number of the mantles broken by the vibrations caused by the traffic. In what follows we shall therefore confine our remarks to street lighting by arc lamps, as the electric arc is so well adapted for street lighting that there is no doubt that it will soon be more widely used than any other agent.

In practical work with arc lamps it is usual to plan the lighting so that the ground illumination will always be above a certain minimum, and in this case the vertical illumination is generally found to be sufficient. In many streets both in this country and abroad the arc lamps are arranged zigzag alternately on both sides of the street. This is an economical way, and, if the streets are narrow, it is fairly effective. Another favourite system in this country is to place arc lamps in refuges down the centre of the street, and in wide, busy thoroughfares this is a good way, although we lose a considerable amount of the reflecting power of the walls of the houses, which is often a great help. A very effective way is used in the Fifth Avenue, New York, which is extremely well lighted. In addition to rows of arc lamps down each side of the street exactly opposite to one another, there is a row down the centre, each lamp in this row being at the centre of the rectangle formed by four neighbouring side-lamps.

Span wires attached to houses on each side of the street are sometimes used for suspending arc lamps, and this method is attracting a good deal of attention at present. In the principal street of Milan the arc lamps are hung in this way from span wires at distances of 60 yards. Although these wires, as well as the overhead wires for the electric tramway, are unsightly in the daytime, yet at night the effect is excellent. It is also a decided advantage to get rid of lamp-posts from the pavements.

For physiological reasons, if we have a brilliant lamp care must be taken that the light is well diffused. If we have a dazzling source of light, then the pupil of the eye partially closes, and so cuts off some of the rays that would have reached the retina had the light been better diffused, and as the effect of the illumination is proportional not only to the intensity of the rays that reach the retina but also to their number, it follows that increasing the intensity of the light may actually diminish the illuminating effect. This difficulty is always experienced when the electric arc is used, and hence many attempts have been made to get over it. The usual way of reducing the dazzling effect is to surround the arc with a good distributing globe. When opal globes are used the light is soft and diffused, but the absorption is considerable. It is a wasteful method to generate a light of fifteen hundred candle power, and then reduce it to a thou-

* To be continued next week.

sand by using a semi-opaque globe; hence the attention of many engineers is directed towards inventing a globe which will not only refract the light in the best possible manner, but will diffuse it so thoroughly that the eye will not be dazzled by looking at it.

Mr. A. P. Trotter, the well-known electrician, invented some fourteen years ago his dioptric lantern, which had ten panes of glass covered with prismatic corrugations, the angles of which had all been carefully calculated so as to produce the best possible distributing effect. Unfortunately, not only was it expensive, but it had a clumsy appearance, and so it was never extensively used. Yet the idea was good, and he may fairly claim to have been the first to prove how important it is to accurately design globes according to the laws of geometrical optics.

The Frédureau and Holophane globes have been designed and made in a very similar way to that employed by Mr. Trotter, but they are much more elegant than his, and are made in all shapes and sizes. The Holophane globes, about which so much has been heard lately, absorb very little light, and yet the diffusion is almost perfect. Those used for street arc lamps are spherical in shape with horizontal prismatic ribs on the exterior, and vertical flutings on the inside, so that the light is thoroughly diffused in the interior, and then suitably distributed by the external prismatic circles. In Paris, on the Boulevards between the Rue Hauteville and the Porte St. Denis, several of the arc lamps have these globes. The general æsthetic effect is good, and the mean illumination has been increased by their use. The practical objections to them are that they are divided into two parts, which need care in fixing together, and that it is difficult to keep them clean; for, like all prismatic globes, they are very apt to catch the dirt, and so need plenty of washing and scrubbing. This materially adds to their expense, for it is obvious that one trimmer could not attend to many of these lamps in a day.

The Frédureau globe is like the Holophane, except that it has no internal flutings, and hence the diffusion is not quite so good, the inside source of light appearing as a bright vertical band from the outside. Although these globes are dearer than ordinary ones, yet, as they enable us to save current, they may prove more economical in actual use.

Street lighting with glow-lamps has not proved successful on any large scale, and considering how much cheaper arc lighting is this is not to be wondered at. What we have said hitherto applies to continuous current arc lamps. In the continuous current arc nearly all the light is emitted downwards, the maximum intensity being at 45 deg. with the vertical. With the alternating current arc as much light is sent upwards as downwards so that it is equivalent to two small continuous current arcs, one being inverted. Up to the present time no thoroughly satisfactory way of utilising the light of an alternating current arc has been found. The ordinary way of using large reflectors is objectionable, as at some distance off they shade far too much of the light coming from the lamp. Mr. S. Z. de Ferranti gets over the difficulty by converting the alternating current into a rectified one or current pulsating, always in one direction, and using ordinary continuous current arc lamps. This method is a very popular one in this country. M. Blondel proposes to convert the alternating into continuous by means of an alternating current motor driving a continuous current dynamo, but this way would be more expensive than the last.

Recently in America a lamp has been invented in which the carbons are placed parallel to one another, and the alternating arc kept at their lower ends by means of electro-magnetic repulsion. If this lamp works well it ought to greatly simplify the problem of how best to utilise the light of the alternating arc. It is still a vexed question with electricians as to whether the alternating current arc is less efficient than the continuous current arc or not. The general opinion seems to be that it is less efficient.

There is no doubt that brilliant sources of light and beautiful globes are desired by the public, and if globes like the Holophane prove a commercial success, a great impetus will be given to the efficient lighting of our streets. Rows of dingy lamp-posts at present obstructing the pavements of the main streets of many towns could be removed and the streets effectively lighted by a few arc lamps in elegant globes, judiciously placed, without unduly burdening the ratepayer.

NOTES.

The London Water Supply Question.

The *Times* has done such good service, and its special correspondent has shown so much fairness and good sense, in regard to the question of the causes of and remedies for the East London water famine, that we regret to find, in its further letter and leading article of Monday last, some suggestions and opinions which are calculated to do mischief. The special correspondent advocates strongly the return to storage cisterns, as a means of guarding against shortness of water and as giving less temptation to waste than the constant supply system pure and simple. That a small storage cistern, to provide against occasional necessary stoppages of water from accident to or repairs in the main, is a necessity even with constant supply, we have always urged; but such cisterns should be of small size and, as far as possible, self-cleansing.* The return to large storage cisterns would be a step backward in a sanitary sense, more especially in the poorer parts of London; it is all very well to say that they can be kept clean; we know very well that they will not be. But the statement that fifteen gallons per head per day "is as much as can be used for legitimate domestic purposes—that is, washing, drinking, and sanitation," only shows that the *Times* special correspondent is behind the age in regard to ablutions. People in the upper class frequently now use from thirty to forty gallons for their morning bath—they want to "get into" water; and the number of those who are not satisfied with less is increasing. What we want is an ample supply; there is plenty of water in England for all requirements, the only difficulty is to get it to the places where it is most wanted. That constant supply gives great temptation to waste is quite true, and this may be best checked by the meter system, or (in order to meet one objection to that) a meter charge for everything above a certain minimum quantity.

* We mentioned and recommended a new form of cistern of this description not long since.

The Earliest Habitations of Man.

M. E. Rivière, in a letter addressed to the Secretary of the French Academy of Sciences, announces that he has discovered a large prehistoric cave in the Department of the Dordogne, into which he has penetrated a depth of 127 mètres. There can be no question of its having been a human habitation, and it resembles others in the neighbourhood which were discovered and explored many years ago by M. Lartet with Mr. Christy, whose collection is now in the British Museum. But the newly-found cave differs from them in that sketches of animals are even more numerous, the wall being literally covered by rude drawings, some of which are cut deep into the rock and are mostly buried under stalagmite. As to the antiquity of the drawings, with the scanty information at present vouchsafed, it is not possible to say much; but it may be observed that if they are of the same character as those previously found in the caves there, the men who drew them must have been contemporary with the mammoth. They are not as old as our palæolithic gravels, nor as recent as, at any rate, the later phases of the neolithic period in western Europe. These rude figures cut into the wall are probably the oldest stone carvings in existence.

Projected Improvements in Paris.

It is intended to carry out a good deal of work in the way of sanitation and embellishment of Paris in view of the 1900 Exhibition. Besides the formation of some new streets to which we have before referred, the Municipal Authorities are proposing schemes for adding materially to the trees and gardens within the city. New squares are to be formed in front of the churches of St. Philippe du Roule and St. Laurent, in Rue Ste Marguerite, on the site of the Trousseau Hospital (which is to be demolished), on the Place Hébert, and on the rising ground at Belleville. The Champs Elysées will undergo quite a transformation. Five hundred thousand francs are to be spent on improvements in the Bois de Boulogne, and 900,000 francs on the Bois de Vincennes. Improvements will also be carried out in the Parc Monceaux, the Buttes Chaumont, and the Parc de Montsouris. Electric lighting is to be introduced in all the principal streets as well as in the Bois de Boulogne; the whole of the work of this kind to be carried out representing an expenditure of more than 4,000,000 francs.

The proposed "Invalides" Bridge.

Part of the Government scheme for the Paris Exhibition consists, as our readers are aware, of the construction of a new bridge over the Seine on the axis of the Esplanade des Invalides. The design has apparently been prepared officially in the "Ponts et Chaussées" Department, and it has been announced by the Prefecture of the Seine that an "enquête" will be held in regard to the scheme from August 17 to September 17; that is, we take it, that formal objections to the scheme can be lodged between those dates, the design being meanwhile open to inspection at the Hôtel de Ville. Our contemporary *L'Architecture*

specially invites the attention of architects and artists to the subject, expressing the opinion that, in view of its exceptional position, the bridge ought to have been the subject of a public competition, like the two principal palaces for the exhibition. In this view we entirely concur; in fact, we cannot but feel very great surprise that the design of such a bridge should have been left to an official department. When we consider the importance of the Invalides, the building to which the bridge will lead up, as an existing architectural monument, the importance architecturally of the two new palaces which will be in immediate connection with the bridge; and the great opportunities which a bridge presents for either making or marring an architectural *ensemble*, it appears to us that the design of this bridge is a matter of even more importance than that of the two new palaces, the competition for which has just been decided.

Welsh Slate Quarry Troubles.

SERIOUS troubles have arisen in the gigantic Bethesda Quarries, Bangor, where between 2,700 and 3,000 workmen are employed, which may considerably influence the Welsh slate trade generally. During the past four and a half years the wages of the quarrymen have been voluntarily raised three times, an advance of 5 per cent. on each occasion being given. Notwithstanding this the men have framed a list of grievances with suggestions which, if adopted by Lord Penrhyn, would not only seriously hamper the management, but would mean a substantial addition to the wages of certain classes of men employed in the quarry. A deputation of the men sought an interview with their employer, and in the course of the discussion two or three of the chief complaints could not be substantiated by them. In particular was this the case with reference to a class of workmen termed "rybelwyr," who are, technically, odd men about the quarry, and, as such, do not of course enjoy the same advantages as though they were established quarrymen. The complaint was that very often after a rybelwyr had improved the "bargain" he was summarily removed in order to make room for a "crew" which very often got a higher poundage than the rybelwyr. On the face of it such a proceeding does not seem very fair, but on the statement being sifted it was found that the men could only bring one case of the kind as proof of the allegations. It may be urged that for fear of being dismissed from their employment the men are not in a position to give the full facts, but Welsh quarrymen are not noted for squeamishness. We cannot go deeply into the matter, but Lord Penrhyn certainly was not diplomatic in his replies to the men's grievances, for he had framed them before discussing the subject with the deputation referred to. Up to the time of writing the men have not struck, and we trust that such a catastrophe will be averted.

The Manchester Ship Canal.

THE half-yearly meeting of the Manchester Ship Canal Company was held at Manchester on Tuesday. The report stated that the gross receipts from the Canal showed an increase of 18,177*l.* as compared with the corresponding six months of the previous year, while the weight of merchandise paying tolls which passed over the Canal was 823,079 tons, as against 600,100 tons. The Engineer of the Company, Mr. W. Henry Hunter, submitted a report as to the progress of the works, in which he stated that dredging operations have been continued without intermission during the half-year, the quantities of silt and sewage sludge deposited in the Canal (partly brought in from the banks in the estuary and partly brought down by the rivers Irwell, Mersey, and Bollin) having been so large as to require the constant employment of six dredgers and two grabs for the maintenance of the depth of water. The works for the permanent electric lighting at the Docks have been completed, and are in operation. The new hydraulic installation at Mode Wheel has also been completed, and is at work. Four of the new hydraulic cranes ordered have been erected on the quay of No. 6 Dock. Some additions to and extensions of the railway system round the Docks have been carried out. The deep-water jetties and coal-tip at Runcorn have been completed, and are in use. The side-dock for the reception of the pontoon at Ellesmere Port has been completed, and the dredging of the dam in front thereof is in hand.

Motor-Generators.

A MOTOR-GENERATOR, or, as it is sometimes called, a continuous current transformer, can be advantageously used in many practical applications of electricity where otherwise accumulators or primary batteries would have to be employed. In telegraphic work generally, in large electric bell installations, in electro-plating, and even to work an induction coil, it is often cheaper and more convenient to have a motor-generator than to have a set of accumulators or a battery of primary cells. It consists, roughly, of a motor and dynamo coupled together, the motor being wound to run when connected directly on to the supply mains, and the dynamo giving any required voltage. Hitherto they have been ordinarily employed in central station working for transforming the low pressure at the continuous current supply station into high pressure in the mains, and then retransforming it down into low pressure again at the sub-station. By this means lighter street mains can be used, and a considerable saving in copper effected. Their use in this respect is analogous to the use of transformers in alternating current circuits. In towns where electrical supply is available, small motor-generators are nearly always preferable to batteries. They are cheaper to instal, occupy far less space, and require no special attention. Electricians are beginning to recognise the merits of this piece of apparatus, and it is gradually being introduced into practice. In telegraphy a very great saving in valuable space could be and is being effected by replacing thousands of primary cells by a few motor-generators. In Chicago, the Western Union Telegraph Company's office has quite recently replaced 60,000 primary cells by a set of steam-engines and dynamos. Whilst this is an improvement, we cannot help thinking that it would have been better to have used motor-generators. From a power point of view the efficiency of the combined plant consisting of steam engines and dynamos must be very low as it has to be kept constantly running; besides, special attendance must be required. The objection, too, that has been urged against the employment of motor-generators, namely, that there might be interruptions in the electrical supply would apply more strongly to this system. Nowadays the risk of failure of the electrical supply from most public companies is so slight that it can be safely disregarded.

The Sheffield Waterworks.

THE long-contested Sheffield Waterworks Bill having now passed into law, the Chairman of the Water Committee of the Corporation seized the opportunity at a meeting the other day of reviewing the position of the waterworks undertaking from the time when the control of the water passed into the hands of that body in 1888, until the present time. Referring to the expenses attending the opposition of the Bill in Parliament, he remarked that it had cost Barnsley at least 13,500*l.* (some said as much as 20,000*l.*) in costs alone; whilst Sheffield's bill of costs would probably amount to between 11,000*l.* and 12,000*l.* Assuming that the Corporation of Barnsley has in consequence to borrow 15,000*l.* to be repaid in ten years, that would involve a rate of 4·89d. in the pound; whilst the sum Sheffield had spent, spread over the same period would only mean a rate of 0·27d. in the pound. That may be, but no one can blame Barnsley for endeavouring to retain control of its own supply, and the net result obtained shows that the money has not been altogether wasted. The partition of the resources of the Little Don Valley has been effected, and the Barnsley Corporation is to construct its own reservoirs, if it sees fit to do so, without being under the control of the rival Corporation. Rotherham and Doncaster will share with Sheffield the water the latter is to obtain under the Act, and the last-mentioned city is now believed to have provided for water, after all the works have been carried out, for the next thirty-four years—sufficient for a population of about 600,000. Everyone will be glad to learn that this prolonged and expensive controversy has now been brought to a close.

Aluminium.

THE uses of aluminium are becoming more and more extended as the metal is becoming better known. Unfortunately the methods of preparing it are by no means perfect, and it is not unusual to find in commercial aluminium a considerable percentage of impurity. Aluminium when chemically pure does not corrode, and will stand prolonged immersion in hot or cold water, but owing to the readiness with which it forms an electric couple with other metals, it is essential that it should not be used in conjunction with them. M. Moissan, in a recent paper read before the Paris Academy of Sciences, said that he had found in many commercial samples of aluminium a small percentage of sodium. The quantity varied from 0·1 to 0·4 per cent., and its presence materially affected the life of the metal. The samples were acted on by cold water, and the decomposition became more rapid after prolonged immersion. This shows the importance of using only pure aluminium in industrial applications.

Public Lectures on Sanitary Matters.

IN connexion with the recent conference of Sanitary Inspectors at Leeds, a report of which will be found on another page, a very

interesting public meeting was held at the Philosophical Hall for the discussion of sanitary questions. The meeting had been a good deal advertised and though the attendance of working-men, in whose interests it was held, was small, the meeting was a success, and will no doubt embolden the same Association to hold similar meetings on future occasions. That there is a distinct need, especially in large and densely populated districts, for the dissemination of a knowledge of house sanitation cannot be doubted, and Public Authorities all over the country might do much to forward the work of their officials if they could arrange for holding periodical public meetings at which the principles of sanitary science could be discussed.

Riverside Disfigurement.

Mr. Richardson Evans, Hon. Secretary of the National Society for Checking the Abuses of Public Advertising, in a letter to a contemporary, draws attention to a growing tendency on the part of manufacturers and others, who own buildings on the banks of the Thames, to use their premises for the purpose of displaying large and various-coloured advertisements. Mr. Evans, in the course of his letter, says that ten years ago hardly a letter of the alphabet could have been descried either on the Surrey or the Middlesex bank. To-day there appears to be a hot rivalry between the owners of mills and stores and wharves and hotels, of chimneys, towers, and sheds, to see who can make the biggest show of painted placards. There is a great deal of truth in these remarks, and we hope it is not useless to appeal to the public spirit of the business men concerned to discontinue the practice.

Back-to-Back Houses.

It is greatly to be regretted that so many back-to-back houses continue to be erected in some parts of the country, especially as there is now almost a consensus of opinion that the perpetuation of the system is a danger to the health of any district in which such houses are erected. At Leeds, notwithstanding the disclaimers of the officials, the practice appears almost to be favoured, for in a recent report of the Inspector of Buildings to the Leeds Corporation, it is stated that during the year ended March 25 last, out of a total of 1,681 houses completed and certified for occupation, there were 1,229 back-to-back houses! The inconsistency of removing large insanitary areas, as at Leeds, and creating them in another place, is sufficiently obvious.

HE MOST REMARKABLE SIGHT IN PARIS.

In using the expression "the most remarkable sight," we are not referring to objects of study in Paris, such as the great collections of the Louvre and the Luxembourg, but merely to the outward aspect of buildings and their surroundings as they strike the eye in a *coup d'œil*. It would be curious to know what answers would be given if one put the question to our readers generally—"What is the most remarkable sight in Paris?" Some, but we hope not many, would probably say "The Eiffel Tower." For many years back the guide-books, and those who go by them, have leaned towards the notion that the Place de la Concorde was the great Paris spectacle. Those of more serious architectural perceptions would probably name the view of the eastern end of Nôtre Dame from the Seine; that view which has had such a fascination for artists, and which is as interesting from its historic associations as from its architectural effect. But we are disposed to think that the most striking outdoor spectacle to be seen in Paris in recent days is one which scarcely any English visitor, not even among architects, knows of or goes out of the way to look at; and that is the great modern Church of the Sacré Cœur at Montmartre.

In saying so we are not wishing to over-rate the architectural merit of the church, or to say that *per se* it would be a building no one should visit Paris without seeing, though it is a modern building that no architect, certainly, should pass over. But it is not the Church of the Sacré Cœur merely, but the church taken in connexion with its site, which has so remarkable an effect.

Montmartre, as most people are aware, is an eminence in the northern quarter of Paris, forming the only hill worth mentioning within the site of the city, and which rises rather abruptly from the general level, and is conspicuous from all the environs of Paris. In its social and picturesque aspect alike it affords an interesting though rather melancholy picture of old Paris. It is a district of poverty, of decayed tenements and ill-paved streets. A Paris cabman will hardly be persuaded to drive you to the church at all, and then only on special and somewhat exorbitant terms; nor can we be surprised at this when we see the streets he has to drive up. There the visitor can still see what the old Paris street pavement was like, as his cab is dragged and bumped with difficulty up the steep roadways paved with large irregular blocks or cobbles of worn stone, sometimes 18 in. or so in diameter. The whole aspect of the place seems to take one well back into the last century, if not further.

In this unpromising locality has the Roman Catholic church set up the most notable outward and visible sign of its modern life and activity in the French capital. In an architectural sense, the style of Abadie's great church is well adapted to the situation. With "some modern touches here and there," it is based on Byzantine models, and as we approach the hill along the level road leading to it, the white mass of the building stands up grandly in the distance against the sky, crowned with its various domes and cupolas, suggesting to the fancy the idea of a kind of citadel of the Christian faith, founded on a rock above the turmoil of the gay and busy city at its feet. As a matter of constructional fact, it is founded to a great extent on concrete; the site fixed on having proved, as has been previously noted in our pages, so full of treacherous and unsatisfactory ground that a large proportion of the funds at first collected for the building were expended in excavating deep pits and filling them with vast pillars of concrete carried down to a stable foundation. The expenditure was a wise if not an absolutely necessary one, for the weight and mass of the structure to be erected on the ground were quite exceptional, and those concerned in the building may have the satisfaction of feeling that it is as solid and monumental in reality as it is in appearance.

It was owing to the antediluvian character of the pavement of the Montmartre streets, coupled with the humanity of the cabman, that we had the advantage of making our first approach to the church so as to see it in the most effective manner. A merciful man is merciful to his beast, and such mercy would be quite inconsistent with driving a cab-horse up the most direct approach to the Church of the Sacré Cœur. Accordingly, our vehicle made the whole circuit of the site by an easier gradient, gradually approaching the building as we wound round it. A finer and more striking architectural effect than is produced by the building as thus gradually approached, and seen from a different and nearer point of view at each turn, it would be difficult to find in connexion with any building of modern times, at all events. The church is built of the hard and very white Château Landon stone; and, seen as it is towering high above the eye from each point of the approach, it gives almost the impression of a dream-picture of architecture, so unusual is the whole combination produced by the steep winding approach and the great shining white structure towering above one's head in the clear Paris air.

Whether one altogether likes all the detail, on closer inspection, is another matter, but it would hardly, perhaps, be fair to judge of this until the smaller details of carved work on the exterior are completed, which is by no means the case as yet. Internally, the church hardly conveys so great an impression of size as the exterior seems to promise, and it looks rather bare at present in the absence of the scheme of decoration contemplated by its architect, of which very little yet is even commenced. The central dome was partially occupied, at the time of our visit, by a great hanging workshop of timber, for the artists engaged on the mosaic decoration there. We may conclude that the whole of the decoration, when complete, will be in accordance with a general scheme drawn up by the original architect. M. Daumet, to whom the work was entrusted on the death of Abadie, showed a disposition to modify it after his own ideas; and in consequence of this the custodians of the building, with a loyalty to their original architect which is highly creditable to them, took the work out of his hands again and appointed M. Rauline, who is understood to be commissioned to carry out the building strictly according to the original scheme of Abadie. Probably the effect of scale in the interior was considerably injured when we saw it, by the hanging structures in the dome, and it will show its size better when they are removed. In spite of the bare look of the interior, however, one cannot but be struck by its immense and monumental massiveness of structure and thickness of walling; in this respect it far more resembles a mediæval building than an edifice of the present days of economical church architecture.

From the platform in front of the façade (which faces south, not west) there is a noble panoramic view of the city of Paris with its domes and towers, many of them those of historic buildings whose names arouse far other associations than those that are connected with the building we are visiting. It is the view of Paris from this point—the "Capital of pleasure" seen from the doors of the great church dedicated to the religion of renunciation, that gives the last touch of interest and contrast to the scene; it is the architectural impressiveness of the building and of its unique position, together with that view of Paris to be seen from its doors, that all combine together to render it, as we have said, the most remarkable sight in Paris, and one which is worth more attention than it usually receives from English visitors.

SKETCHES OF LONDON STREET ARCHITECTURE.—IV.

No. 12, Hans-road, S.W.

This hou was built in 1893, during the partnership of Me srs. Mackmurdo, Hornblower, & Walters, architects. The front has nothing very remarkable about it, but it is eminently suitable for our series of "Street Architecture." It shows what can be achieved by simplicity of arrangement, and how restful is the appearance given to a street frontage when treated in so unpretentious a manner.

NOTES FROM THE STRAITS SETTLEMENTS:

PENANG.

The Trustees of the Penang Free School, at the beginning of January last, advertised that they would be glad to receive designs from architects for the enlargement of the present school buildings. They wanted accommodation for 200 boys in addition to the present number, and were prepared to spend 18,000 dols. They also added that preference would be given to the plan which gave the greatest accommodation for the money.

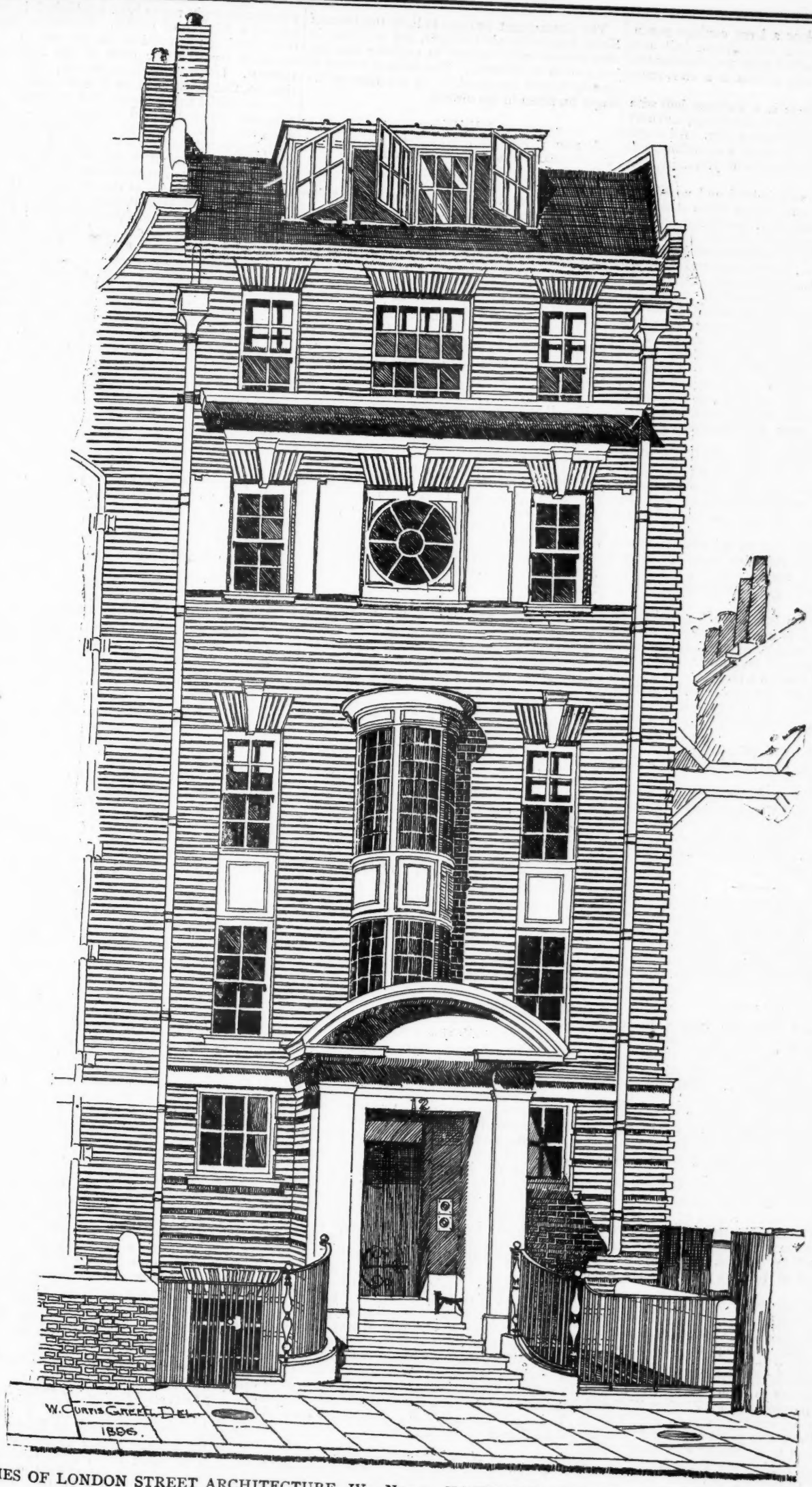
Several sets of drawings were sent in by Penang and Singapore architects, and on February 22 the Committee announced that they had decided to accept the design submitted by Messrs. Swan & Maclaren, of Singapore and Penang. Mr. Barnett, of Penang, was awarded the second premium; Mr. Pengelley, also of Penang, was placed third.

The site is a bad one for a school, as it is very long and narrow, the present buildings occupying most of the ground; therefore it was found necessary to pull down some of the existing buildings and put up in their place better planned blocks. The central block, which was built in 1816, wanted repairing badly, some parts being dangerous.

Messrs. Swan & Maclaren propose to pull down the present front block, which now accommodates eighty boys, and build in its place a two-storied building, and remodel and restore the centre block, pulling down and doing away with those parts that are in a dangerous condition.

The present school consists of six separate blocks, five of which contain one badly-planned class-room in each, and the other, the central block, has several small rooms which are practically useless as class-rooms.

The new front block is T-shaped on plan, and



SKETCHES OF LONDON STREET ARCHITECTURE, IV.—No. 12, HANS-ROAD, S.W.—Mr. A. H. Mackmurdo, Architect.

has on the ground floor a large carriage porch leading to the entrance, and staircase hall and head-master's room, which is in the centre of the building. On each side of this is a class-room for sixty boys.

On the first floor there is a staircase hall with a class-room on both sides for sixty boys, and over the porch one accommodating fifty. All round the building on both floors is a verandah 10 ft. wide, so that the rooms are well protected from sun and rain.

The building is well lighted and ventilated, each room having windows or doors on at least three sides, and additional ventilation is provided by means of openings all round the rooms at ceiling level, the first-floor rooms having, in addition to the above, ventilating openings in the ceiling communicating with a large flèche in the centre of the roof. A new front is to be put to the building next to this to make it harmonise with the new block, but in other respects it remains as at present. The old central block will be thoroughly remodelled, and those parts that are in a very bad state will be pulled down, and the ground thrown into the playground. By pulling down one or two walls, and knocking three rooms into two, and adding new windows and doors, four very fair class-rooms and a chemistry-room can be made.

Most of this building, although it is so old, is in a very good state, but it will be found necessary to build one new front. A new covered way will be made connecting the three blocks, and acting as a verandah to the two old blocks.

The style of architecture adopted is French Renaissance. The verandah walls are pierced with arches, and are relieved by detached columns, Doric on the ground floor and Corinthian on the upper floor.

The ends and porch have gables, and in the centre of the roof is a circular flèche, growing out of an octagon and having a domed top. This acts as a ventilator and bell turret, and is constructed of wood covered with lead.

The main roof will be covered with red segmental Chinese tiles, and the roofs of the verandahs will be flat laid with two courses of Malacca tiles in cement.

The floors will be of teak, and all the timber and joiners' work will be of merbau, a finely-grained hard red wood.

Additional accommodation is provided for 297 boys. The superficial area allowed for each boy is 50 per cent. greater than the Educational Council require at home, and the cubic space 100 per cent. greater. This is considered necessary in such a hot climate.

It is stated that a railway up the Penang Hill is likely to be made. It is to be on the lines of the Peak Railway, Hong Kong, and a well-known local engineer has just returned from Hong Kong, where he has been staying for some time, no doubt with a view to studying the work of the railway.

SELANGOR.

At the present time, the only port in this rapidly-growing state is situated eleven miles up the Keang river. The river is but a small one, full of very sharp bends, and only open to steamers of small draught. The Government last year commenced the extension of the railway from this point to the Kuala or mouth of the river, where an excellent site for a harbour was found. This year the work of building a long range of wharves is being rapidly pushed on, and along this the railway will run.

When completed, the harbour will be open to large ocean going ships, and should be a great benefit to all the Native States, as the delay and extra expense of transhipment of cargo from the big steamers to small coasting boats at Singapore and Penang will be avoided. The wharves will be constructed of iron on cylinders and screw piles.

Surveys are now being made for the extension of the railway from Selangor, on the West Coast, to Pahang, on the West Coast, and the work of constructing will probably be started by the Government this year.

The extension to the south is already in hand.

A new railway is about to be commenced, starting at Butterworth, in Province Wellesley, opposite Penang, running south to Parit Buntar, in Perak. From this point the Perak Government are bound by agreement with the Company who are constructing the Parit Buntar line to make a line connecting this with Taipeng, the capital of Perak. This will prove of great use to the Northern States, and as it passes through a valuable sugar-planting district, should pay well.

The Government propose to light the town of Kuala Lumpor by electric light, and with that in view have recently engaged an engineer who has just arrived from home. The railway station is already lighted by electriciiy, as are some of the larger tin mines in the district.

MALACCA.

A new railway is shortly to be started here. The contract was signed a few weeks ago.

SINGAPORE.

Mr. Tomlinson, Water Engineer, Bombay, has been appointed Municipal Engineer in place of the late Mr. James MacRitchie. He will take up his appointment in June.

At a recent meeting of the Municipal Commissioners it was proposed that the vacant post of Inspector of Buildings, previously held by an engineer, should not be filled up, but that an Architect to the Municipality be appointed at an increased salary, with assistants to do the work previously done by the Inspector of Buildings.

The whole thing was referred to the Finance Committee.

PERAK.

The Perak Government are about to carry out a scheme of irrigation in the Krian district. In 1894 Mr. Vincent, of the Irrigation Department, India, reported on the possibility of carrying out such a work in Perak and in Kuala Selangor, and the result is that the Government are now putting the work in hand. It is much needed, and should prove a great boon to the padi planters, who so often lose a good crop through the want of water. Mr. O'Shaughnessy has been appointed Irrigation Engineer to the Perak Government, and has just arrived and taken up his appointment.

PANANG.

Surveys are being made by the Raub Gold Mining Company for a water-power electric installation for the mines.

The power it is proposed to obtain from the head waters of the Sempan River and a path is being cut from the Raub Concession to this place along which the power cables will be carried to the batteries and workings.

THE SANITARY INSPECTORS' ASSOCIATION:

CONFERENCE AT LEEDS.

The annual conference of the Sanitary Inspectors' Association was opened on the 20th inst., at Leeds. The delegates were received by the Mayor, the Right Hon. W. L. Jackson, M.P., in his room at the Town-hall, and afterwards the company adjourned to the Council Chamber, where the Mayor delivered an address of welcome, in the course of which he said that, whatever might have been said of Leeds in the past, he was entitled to claim for it now that it was making strenuous, and he believed successful, efforts to improve the sanitary condition of the city. They had undertaken a great many street improvements, which involved the destruction of much property that could not be described as having the perfection of sanitary arrangements. The death rate in the insanitary area was 39 per 1,000, whereas the average for the city was about 20. The population there was about 4,000, and the death rate was double what it was in the other parts of the town.

Mr. H. Thomas (Bermondsey), Chairman of Council of the Association, moved a vote of thanks to the Mayor and Corporation for their invitation to use the Town-hall, and the Mayor of Maidstone (Alderman Baker) seconded the motion, remarking that he had long been of opinion that sanitary inspectors should have permanent positions, so that they could not be interfered with unnecessarily in their battle with disease and dirt.

The motion having been carried, and the Mayor having replied, the meeting proceeded to elect new members, and then adjourned. A smoking-concert was held in the evening at the Great Northern Railway Hotel.

On Friday the conference was resumed in the Town-hall, when, owing to the absence of the President, Sir Benjamin Ward Richardson, M.D., through indisposition, the chair was taken by Mr. T. Pridgin Teale, F.R.S., Chairman of the Yorkshire Branch of the Association.

A Ministry of Health.

The Chairman then read an address, prepared by the President, entitled "A Ministry of Health." In the course of his paper Dr. Richardson said that some twenty years ago he raised the question whether we ought not to have established in our country a Minister of Health. He did not think there could be two opinions on the subject that the basis lay with the office of the Registrar-General. It was by modifications of, and additions to, that department, as it now existed, that the new official and governmental institution for which he pleaded should be established. The department would be no longer for mere registration, but would include all that related to health. Correctly re-named it would be a Ministry of Health, or a State Department of Health. The construction and duties of the Ministry of Health would lead to several divisions of labour, which he referred to under the following heads: Registration, meteorology, coroners' returns, medical local duties, adulteration reports, factory supervision, veterinary supervision, prison and police supervision, and supervision of public works. The Minister of Health would collate the leading facts connected with the work of the various sanitary officers of the kingdom, and condense them annually into a form that would serve as a permanent history of the results of sanitary progress. To this end each local authority would send to him, at stated times, and always once annually, the report of its medical officer on the health of the whole district under its charge; a report systematically arranged for ready reference, and for after-arrangement by the central department. There was at present much confusion in the inter-working of the Public Health Acts and the supervision of the factory hands under the Factory Acts. The factory medical inspectors who knew the duties of sanitary work in the great manufactories better than any other class of men, and whose functions were of longest date, were crippled in their efforts by the circumstance that their supervision was too limited. The mortality incident to industrial pursuits was a drain on the national vital wealth.

There would be several divisions of labour in the proposed Ministry of Health, and he suggested that these might be reduced to six departments in chief. 1. The Registration Department.—In this would be included the registration of births, deaths, and marriages. The registration of disease. The registration of coroners' returns. The registration of returns from the meteorological observatories. 2. The Local Government Department.—In this would be included the work now carried out by the Medical Department of the Local Government Board, with a complete system of poor law sanitary inspection. 3. The Factory and Industrial Department.—In this would be comprehended the sanitary supervision of factories. The regulation of age to labour. The inspection of industrial pursuits generally, in relation to the health of the industrials. 4. The Analytical and Chemical Department.—In this would be undertaken the superintendence of the Adulteration of Foods Act, and other proceedings of a chemical and analytical nature. 5. The Veterinary Department.—In this would be considered the diseases affecting the inferior animals. The condition of animals imported into the country. The cause, the course, and the prevention of the epizootic diseases. 6. The Public Works and Prisons Department.—Under this department would be brought the sanitary condition of all prisons and other public buildings that are already existing. The construction, in a sanitary point of view, of new public buildings. The condition and construction, in a sanitary point of view, of the public roads, parks, and water supplies, with which the Government is specially concerned. To each of these departments there would be a chief. The whole, under the presidency of the Minister of Health, would form a Council of Health appointed by the Government for the Government and the people. The Council, if it were properly selected, would have for its members, in addition to the Minister of Health, a statistician, a physician, a factory surgeon or physician, chemist, a veterinarian, and a sanitary architect and engineer, with two other important officials. In fact, every part of sanitary science would be fully represented, and if the salaries allotted to the chiefs of departments and their dependents were efficient, no country in the world would possess so perfect a sanitary organisation.

The Chairman said that the address was a very important one.

The Cost of Destroying Refuse by Heat.

A paper, prepared by Dr. J. Spottiswoode Cameron (Medical Officer of Health for Leeds) and Mr. George Darley (Superintendent of the Refuse Removal Department, Leeds), on "The Working Cost in Leeds of Destroying Refuse by Heat," was read by Mr. Darley. Excluding the recently-erected destructor at Meanwood-road, it

was stated that the three destructors in Leeds at Armley-road, Beckett-street, and Kidacre-street had been working pretty steadily, although not up to their full possibilities, during the three years ended March 25, 1896. During that period 181,645 tons of refuse had been burnt. The working cost, exclusive of land, plant, and exclusive also of any share of the salary of the superintendent of the refuse removal sub-department or his staff, or of other cost of superintendence, had been 14,773*l.*, giving a rate of 19·52 pence per ton of refuse destroyed. The cost of the erection of the three sets of buildings, and of additions to them up to March 25, 1895, the middle year of the period, was 24,266*l.* The interest on this for three years, at 4 per cent., amounted to 2,912*l.*, or nearly at the rate of 3·85 pence per ton of the refuse consumed during the period. The cost of land purchased for these three destructors, up to the same date, was 7,999*l.*, and its value at 4 per cent. for three years, 960*l.*, equivalent to nearly 1·27 pence per ton of refuse consumed during the triennium. The total cost per ton, excluding only cost of superintendence, during the three years at the three destructors, taking the whole capital at 4 per cent., had therefore been 24·64 pence per ton, or just over 2s. o½d. Four per cent. was taken on the capital all round, as it had to be borrowed for a limited period. As, however, all repairs (not extensions, only repairs) were placed to revenue account, 4 per cent. was probably quite enough, even for the structure. For the land it was, of course, too much to allow. If the interest on land were taken at 2 instead of 4 per cent., the cost per ton was less by the half-penny and its oddment, and became exactly 2s. per ton.

The Chairman said he presumed this included all the cost of cartage.

Dr. Cameron said it included cartage from, not cartage to. Replying to questions asked by various members, Dr. Cameron said that the one object of their destructors had been to have shorter distances for removal. They could not put this material into tips as they used to do, in the heart of a large centre of population. They must therefore cart it out of town at considerable cost, or do something with it in the town, and although they had rather put before them the expense that was incurred in destroying the rubbish, they must not regard the 2s. per ton in destroying rubbish as loss, because in many cases it would cost them more than 2s. to cart the stuff away to a harmless place. They had had occasional complaints of effluvia from the destructors, and usually these complaints had occurred either from some fault in the arrangement, or when the temperature had been allowed to drop down to 700 or 800 deg. When they kept the temperature above 1,000 deg., they had comparatively little complaint. Most of their destructors worked all the year round at about 1,500 deg.

The Law Relating to Public Health.

Mr. R. W. Evans, B.A., LL.B. (Halifax), read a paper on "Public Health Law." He said that one word, and one word only, described the present state of the law relating to public health, and that was "chaos." This he said upon no less an authority than that of the Lord Chief Justice. The standard work which most of them used, "Lumley's Public Health," had now developed into a substantial volume of 1,528 pages. He had taken the trouble to count the number of statutes which either directly or by incorporation regulated their work, and they came to the astonishing figure of 161. Of these they might call twenty-eight principal Acts, and 133 subsidiary or incorporated Acts. Then, when they had got their 161 statutes, the question arose, what on earth did they all mean? In his judgment, they might just as reasonably expect Parliament to pass a decently drawn and intelligible Act as to expect it in its corporate capacity to paint a picture for the Academy. Mr. Macmorran referred to no fewer than 5,500 decisions on public health, many of them irreconcilable, which had been given in the endeavour to find out what Parliament really intended by the various statutes. In his opinion codification of the law was the only remedy.

Why Dwelling-Houses are Sometimes Unhealthy.

The next paper, entitled "Why Dwelling-Houses are Sometimes Unhealthy," was prepared and read by Mr. J. Lindley (Batley). He remarked that the healthiness of a dwelling-house depended upon six essential points:—1. Pure Air. 2. Pure Water. 3. Efficient Drainage. 4. Ventilation. 5. Cleanliness. 6. Light. Without these no dwelling-house could be healthy. And it would be unhealthy just in proportion as its deficiency existed in these various points. To have pure air, the dwelling-house must be so constructed that the atmospheric air should penetrate every corner. Here he would observe that back-to-back houses were a grave departure from this rule, also one-roomed houses, but worst of all cellar dwellings. The air we breathe was more essential to life than either water or food, and yet we found dwelling-houses so constructed that the architect and builder might have been most careful to ignore its necessity. Next in importance to pure air was pure water. The use of cisterns for dietetic purposes was open to very grave objections, not only because they were liable to become fouled if not properly protected against the entrance of aërial impurities, but they might in so many ways become polluted and therefore dangerous to health. No dwelling-house with an untrapped drain having a connexion with the main sewer or cesspool, whether it be from a sink, waste pipe, water-closet, or for draining the basement, could ever be healthy. Not only was it necessary that the drains should be correct, but the main sewer must be properly constructed and kept in good working order so as not to be a nuisance. Ventilation, or rather the want of it, might render a dwelling-house unhealthy. Once ensure that the air in a dwelling-house was stagnant, and sickness was certain to follow. Cleanliness was absolutely necessary for the preservation of health. Every dwelling-house, in his opinion, should be provided with a bath. A dwelling-house might be unhealthy by its walls being papered with coloured paper containing arsenical poison used in the colouring of the same. Flock paper upon walls was a source of mischief in affording means for harbouring dust, therefore it should be discouraged. Papering of walls should be avoided as much as possible, and colouring or an equivalent adopted. Light was as important to health almost as air, and it might be said without fear of contradiction that the dwelling-house was the healthiest which was the lightest and most airy; therefore a dwelling-house could not have too much natural light.

Dr. Cameron expressed the hope that in future legislation cellar dwellings would be absolutely forbidden.

Mr. Arlett (Eastbourne) urged that in the erection of artisans' dwellings provision should be made that the rooms should not be of a size which would cause their occupation by families to be injurious to health.

Mr. Humphrey (Eastbourne) said that he had been surprised to see so many back-to-back houses in Leeds, and he hoped that they were not appreciated in the West Riding of Yorkshire.

Dr. Cameron said that a conclusion of that kind would be distinctly wrong.

Sanitary Administration in the West Riding.

Mr. W. Holmes (County Sanitary Inspector, Wakefield) contributed a paper on "Sanitary Administration in the West Riding of Yorkshire." He remarked that there were 435 administrative authorities in the West Riding, and the number of sanitary inspectors was 250, with salaries varying from 5*l.* to 250*l.* per annum. One hundred and forty-two authorities had adopted the Notification of Infectious Diseases Act, representing a large proportion of the population. The time had come, he thought; for the Act to be made compulsory for the whole country. The questions of water supply, sewerage and sewage disposal, and other matters were noticed, and reference was made to the work of the Rivers Board.

The Drainage of Buildings.

Mr. R. W. Cass (Pudsey) next read a paper on this subject, under the following heads:—(1.) Relative importance of underground drainage and plumbing work. (2.) Improvements in and relating to the fixing of water-closets and soil-pipes. (3.) Improvements in and relating to the discharge of liquid filth from sinks, baths, lavatories, and fall-spouts. (4.) Gully and other traps, their size, form, and position, having regard to the influence they exercise on the drains and sewers; also on the nature and treatment of sewage. Large deep traps condemned; and, (5.) Importance of neat excavations for drainage work, with careful filling and special use of concrete. It was, he said, much more easy to get the average property owner to spend 10*l.* on works above ground than to persuade him to spend 10s. below ground in fulfilling the necessary requirements of modern drainage. It was no uncommon thing to find the most costly and elaborate buildings with the most insanitary and defective drainage. It was most difficult to get the public to recognise the following important and undeniable facts respecting drainage:—(1.) That if one thing above another was worth doing well it was drainage. (2.) That good drainage was in the end always the cheapest. (3.) That bad drainage was always buried in the sure hope of an inglorious resurrection. (4.) That through lack of adaptation, and on account of carelessness and want of knowledge in design, bad drainage was very often the most costly to start with. (5.) That if the health of a people was to be maintained, the soil under and above their dwellings must not be polluted. (6.) That good drainage was the best safeguard against a polluted soil, and, in many cases, the best means of protection against a polluted water supply. The chief object to be kept in view in designing a system of drainage was that it should be so constructed as to discharge, in the most speedy manner possible, the matters which it was intended to convey, and that no foul decomposition of such matter should take place in the drains or their appurtenances. For this purpose, such means for inspection, flushing, and ventilation as were necessary should be provided, the object of ventilation being that of supplying fresh air to the drains rather than that of extracting and diffusing foul gases which should have no origin or existence therein.

In dealing with the third head of his paper, the author said that fall-spouts or rain-water pipes were in a good many towns connected direct to the drain, and were said to fulfil the dual function of ventilating the drains and carrying off the water from the roofs. That this arrangement was a bad one he was fully convinced, for the following reasons:—1. That when sewer gas was displaced by the rainfall, the ventilation was least efficient and least needed. 2 *a.* Liability of drain-air from these pipes finding its way into dormer windows; *b.* Under the eaves of the roof; *c.* From defective joints caused by expansion and contraction of the metal, especially when the pipes run down near windows. 3. From the tendency of the metal to corrode where it enters the ground, causing leaks into the foundations of the buildings and forming means of access for drain-air into the building, and especially under the floors. 4. Liability of silting up of the drains at the foot of the fall-pipe, from sand, old mortar, &c., from the decaying of the roofs and chimneys. 5. Because the water from the roofs should as far as practicable be passed through the traps receiving foul liquid. In speaking of the form, size, and number of gully-traps used about a building, the following, he said, were some of the most important points which should be kept in view:—1. All traps receiving foul liquid should fulfil the conditions of a good water-closet. They should not retain deposit of solid matter. 2. They should not be too large, so that the contents of the trap could be frequently and thoroughly renewed. 3. The area of the grate should be of the same shape, equal or larger in area as the surface of the water in the gully and immediately over the same; if not, foul accumulations of grease would collect at the water line, if foul liquid was passed through the grate. 4. If the dish and the gully were not in one piece the dish-brick should be properly socket-jointed to the gully, so that no liquid escaped between the gully and the dish, as this defect was the most fruitful cause of nuisance that he knew of respecting drainage. 5. The trap should be so formed that a head of water of at least 6 in. should be secured above the outlet of the trap, so that a small volume of water would lift the solids from the bottom of the trap. The speculation that long deep traps prevented the fouling of the drains and sewers by the retention of solid matter was a delusion and the opposite was the effect; these did no good and a great deal of harm; they were sites of foul decomposition and simply acted as retorts for the generation of foul gases; moreover, they prevented the sewage from getting away from the premises in a fresh state, as they fouled and polluted every drop of water passed through them. Where sewage had to be treated chemically, as a matter of economy all such articles should be abolished, for when foul decomposition had set in the treatment was tenfold more difficult and costly, and the general results very disappointing. He mentioned this incidentally, because the treatment of sewage should start at the house and not at the outfall; every available means should be adopted for preserving and delivering the sewage of the outfall in as fresh a state as possible. It was impossible to have anything but foul drains and sewers if the sewage was passed through thousands of such abominations as the miniature cesspools, called gully traps, which were used in a great many districts throughout the country.

No more dangerous or unnecessary operation could be witnessed than that of men lading out, carting away and dumping on vacant land, surrounding our towns with this abominable filth, which should never have been allowed to accumulate, but should have been carried by water through the sewers before foul decomposition had set in. In dealing with the more common causes of nuisances from drains, the author said that the operation of laying a drain in solid ground, given reasonable care and accuracy in grading the bottom of the trench, was an easy matter as compared with laying a drain which was partly in solid and partly in made ground. It very often happened that that part of the drain which was nearest to the building was in made ground, and that the gully traps and a length of drain, more or less, actually stood in part of the trench which had been got out for the foundation of the building, or owing to the level of the courts and areas about the building being considerably higher than the original surface of the ground. When such was the case, the greatest care should be exercised; such precautions, however, as were necessary to prevent collapse in these too frequent cases were not taken. All drains and their appurtenances in such cases should be laid on a foundation of concrete. What was generally done, and what took place, was this: The ground was elevated to the required level, and the drains simply laid therein. The builder often assumed that the drains would remain where he placed them; such, however, was not the case, the ground subsided, the joints and often the pipes were broken, the leakage from the drains further assisted the subsidence of the ground, part of the soil contiguous with the drain was washed away, the surface of the trench was levelled up, and a system of out-irrigation was set up in the ground and about the house, the soil eventually became sewage-clogged and grossly polluted, the space under the floors or basement became a literal cesspool. One of the greatest mistakes that the sanitary inspector could make in inspecting drainage works was to assume that the same would remain as he saw them before being covered. He was strongly of opinion that all drains should be bedded in concrete to at least half their diameter.

The Conference then adjourned, when the members proceeded to the Fire Brigade station, where they were photographed in a group. Subsequently, under the direction of Mr. T. Swallow (Leeds), they visited the works of the Leeds Fireclay Company, by whom they were entertained to luncheon.

Tenure of Office.

The conference was resumed in the Town Hall later, when M. W. H. Grigg (Fulham), Chairman of the Superannuation Bill Committee, read a paper on "The Sanitary Inspectors' Tenure of Office and Superannuation Bill, 1897." He said they were now a numerous and responsible body, possessing a legal status, and had received flattering recognition from the Local Government Board, and he was convinced that nothing would increase their influence for good, or the respect in which they were held, so effectually as this making themselves and their influence felt in Parliament. The hardships not infrequently suffered by sanitary inspectors were through "annual appointments," failures to reappoint, or dismissals for no other crime than increasing age—frequently after very many years of faithful service—without compensation, superannuation, or consideration of any kind. The introduction of "The Sanitary Inspectors' Tenure of Office and Superannuation Bill" was a serious, intelligible, attempt to do something towards the redress of the disabilities and grievances of sanitary officers, and the removal of a serious hindrance to the efficient carrying out of their duties. Let it be distinctly understood that whilst they had no sympathy with misconduct or incompetence, they demanded that every competent, honest, well-conducted sanitary inspector should be placed out of the reach of spite, tyranny, oppression, or want, and in a position to conscientiously and fearlessly perform his duty.

A discussion then followed, in which Messrs. Barralett, Dunham, Thomas, Jennings, and others took part.

On the invitation of the Mayor, the members partook of tea in the Victoria Hall in the Town Hall, Councillor Womersly (Chairman of the Sanitary Committee) presiding.

In the evening a public meeting was held in the Philosophical Hall, Councillor Womersly occupying the chair. The Chairman, in the course of his remarks, appealed to the public to assist the inspectors in their work, in the interest of the public themselves. He also referred to the decrease in the death-rate in Leeds, from 28 per 1,000 in 1874 to 21 per 1,000 in 1894.

Mr. Pridgin Teale, President of the Yorkshire Branch, said that he discovered many years ago that very few houses were safe to live in. Were they now able to reverse that opinion, and say that very few houses were unsafe to live in? To some extent he hoped they could, at any rate as regarded the well-to-do people, and perhaps as to the cottages of the very poor, and less so for the rest of the small back-to-back houses built a few years ago. There still remained much to be done in the way of systematic house-to-house testing. Seeing that the tenants of the small houses had very little power in themselves, either of finding out what was wrong or getting things put right; seeing, moreover, in large towns such small dwellings were a large majority of the houses, where were they to find the remedy? The remedy came from the public sanitary authority, the City Council; and the agents through which that authority worked were the sanitary inspectors, acting under the guidance of the Medical Officer of Health. Despite all that had been done by those inspectors, the fact remained that there were hundreds, perhaps thousands, of houses in Leeds which had never been thoroughly inspected, and they knew from experience gained in inspecting that a very large proportion of those were likely to have grave sanitary defects. Could the work of the City authority be supplemented by private effort? There had been in Leeds for several years a voluntary society with the very sensible title of the Sanitary Aid Society, which aimed at helping those who were willing to help themselves. If it could instruct and inspire with sanitary enthusiasm the occupiers of small houses, so that every householder should feel it his duty to find out whether his house was healthy or not, free from sanitary defects, it would be doing a still greater work than it did. By that means sanitary cleanliness, personal cleanliness, and "houseproudness" would grow up together, and they should in time see a higher standard of life and character gradually asserting itself amongst even the poorest of the people.

An address was delivered by the Rev. Canon Ivens (Vicar of Sowerby Bridge). He first spoke of the progress that had been made in sanitary science during the last fifty years. What was wanted to-day was that they should learn to look upon the ravages, the destruction of life, the disease which was wrought by neglect, and the laws of health, in something of the same light in which they looked on the mischief wrought by drunkenness. And so he urged upon all to treat the sanitary regulations in which they lived as though they were as important.

Mr. W. W. West (Walthamstow) also addressed the meeting, directing his remarks to the necessity of cleanliness, not only of person, but of the room, the house, and the town in which people lived.

Mr. Thomas (Bermondsey) proposed a vote of thanks to those gentlemen who had addressed the meeting, and Mr. E. Tidman, C.E., the honorary secretary, seconded.

The motion having been agreed to, the Chairman replied, and the meeting terminated.

On Saturday morning the Conference was resumed at the Town Hall, when a brief discussion took place on the subject of tenure of office, after which several votes of thanks were passed to the readers of papers and others. At the conclusion of the discussion visits were paid to the Armley-road destructor and the Farnley Ironworks. The party returned to the Town Hall about noon, and then inspected the Art Gallery. After luncheon they drove to Kirkstall Abbey, calling, *en route*, at the Yorkshire College and at the Kirkstall-road Baths. In the Abbey grounds the party was formally received by Mr. Womersley, who was subsequently accorded a vote of thanks for providing tea.

In the evening the members of the Association, who were joined by a number of guests, dined at the Great Northern Hotel. Mr. Henry Thomas, Chairman of the Council (Bermondsey), presided, and among those present were Councillor John Gordon (Deputy-Mayor), Mr. T. Pridgin Teale, Alderman J. S. Loe, Councillors S. Denison, Womersley, and J. Green Hirst, Dr. Cameron, and the Rev. Canon Ivens.

A considerable number of members of the Association stayed in Leeds over Sunday, and attended morning service at the parish church.

New Board School, Clyne (Vale of Neath).—The new Board school of this parish was formally opened recently. The architect was Mr. D. M. Davies, while Mr. Rosser was the contractor.

Illustrations.

RESTORATION OF THE MAUSOLEUM OF HALICARNASSUS.

By the late Professor Cockerell.

THIS illustration, which is given in this number in connexion with the first portion of Mr. Stevenson's valuable paper on the Mausoleum (printed on another page), is a reproduction from a drawing by the late Professor Cockerell, embodying his idea as to the design of the Mausoleum.

This design was made, of course, before the discovery of the actual remains of the monument by Newton; and, as Mr. Stevenson shows in his paper (to which the reader is referred), it is no longer tenable in detail, as it will not agree with the remains of the building in some important points. It is however the best restoration which has been made from merely thinking-out Pliny's description, independent of the remains of the building, and is of interest moreover as an unpublished design by one of the most gifted and accomplished of the older school of modern classic architects in this country.

In regard to Mr. Stevenson's paper on the subject, which will be completed in the two succeeding numbers of the *Builder*, we think no apology is necessary for devoting some space to the subject. The Mausoleum was one of the most noted structures of the ancient world; we have a careful though concise description of it by a well-known ancient writer; and we now have all that has been found of the actual structure in our own national museum. Under such circumstances, it seems almost a point of honour that English architects and architectural students should make the most of these materials, and should at least endeavour to get as near to a realisation of the actual design as the remnants of it which are in our keeping will allow of. It can hardly be said that this has been done yet; there was certainly room for Mr. Stevenson's independent study of the subject, and we recommend his paper to the attention of our readers, as an exceedingly thoughtful and acute piece of architectural reasoning.

THE PARK HOSPITAL, HITHER GREEN.

It will be remembered that this is the largest of the three infectious hospitals in course of erection by the Metropolitan Asylums Board, accommodation being provided here for 548 patients.

At and near the entrance gates are the medical superintendent's house, the lodge, the offices, the waiting and discharge rooms, mortuary, &c. To the east are the diphtheria and enteric pavilions, with the laundry and workshops on the south. To the west are the scarlet-fever pavilions, with the isolation pavilions behind, and at the extreme south-west is the nurses' home. In the centre are the kitchen block, stewards' stores, and residences for the servants; while on either side are the steward's house and that of the assistant medical officers.

Open but covered corridors connect all portions of the hospital, and beneath these all subways for all pipes, wires, &c.

The buildings will be heated by hot water in addition to fireplaces, and will be electrically lighted throughout. Telephones will provide communication between every portion of the hospital.

The buildings are of stock bricks with red dressings, glazed bricks being employed where necessary. The floors are fireproof throughout.

The general contractors are Messrs. Leslie & Co., of Kensington-square. The architect is Mr. Edwin T. Hall.

FARM HOUSE, ORCHARDLEIGH, SOMERSET.

This farm-house is situated on the side of a steep hill in the Somerset cheese-making district, and was built to replace an old house which was burnt down. The cheeses are stored in a large room over the dairy and cleaning-place, which has no communication with the remainder of the first floor. The plan has been arranged so that a part of the house can be cut off and used as a labourer's cottage if necessary. The walls are built of local stone, quarried on the estate, with Bath stone dressings, and the roofs are covered with Bridgwater flat tiles. The contractor was Mr. J. Vallis, of Frome, and the architect, Mr. Bertram V. Johnson, M.A. The drawing was hung in last year's Royal Academy Exhibition.

"BROWNSWOOD," ENNISCORTHY, IRELAND.

THIS residence, now completed for the Baroness Gray, is really an extensive addition to the original house, which was a plain, square, rough-cast building (with a door in the centre and windows on each side, a type of house common to that part of the country). Owing to the nature of the site, it was found best to retain the old house as a centre and add wings on either side; this was also desirable from the fact that the house has one of the finest and most extensive views in the country, and it was a great matter to have all the principal rooms commanding the view. The arched recesses on the top of each gable are also designed especially for the view.

Unfortunately, the plan was not sent to us in time for publication. The principal feature is the large hall and staircase (which occupies the position of the old courtyard). The principal entrance is now in the end, being more sheltered than the front—the old front entrance is now the garden entrance. The two front rooms of the original house are now the library and ante-drawing room, and the two large bays at each end are respectively the dining room and drawing room.

The general walling is rough cast, with Dumfries stone dressings and red brick. The roofs are covered with Broseley tiles.

All the works have been carried out from the designs of Mr. William Wallace.

COMPETITIONS.

CENTRAL FIRE ENGINE STATION, ABERDEEN.—The tender of Messrs. Gall & Walker, Aberdeen, for the mason work of the new police workshops in King-street, amounting to 1,312*l.* 19s. 6d., has been accepted by the Town Council. The burgh surveyor (Mr. W. Dyack) will carry out the joiner work by workmen employed by the Council. As regards the central fire station to be erected on the remainder of the Council's ground at King-street, it has been resolved to invite competitive designs from local architects—first premium, 50*l.*; second, 25*l.* If the first design is carried out, the premium in that case will merge in a commission of five per cent. on the cost of construction of the building. The total cost of the two buildings will be between 15,000*l.* and 16,000*l.*

ARCHITECTURAL SOCIETIES.

NORTHERN ARCHITECTURAL ASSOCIATION.—On the 22nd inst. an excursion visit was made to Darlington by a good gathering of the members of this Association. The party was met at Bank Top Station by Mr. G. G. Hoskins, a past President of the Association, and after some time spent at St. Cuthbert's Church and the Free Public Library, inspections were made of buildings now being carried out in accordance with the designs of Mr. Hoskins, and comprising the new offices for the Darlington Guardians, the Technical College, and the new business premises of the North of England School Furnishing Company, Limited, the terra cotta used in all these buildings being greatly approved of. The visit concluded with an inspection of the recently-erected King's Head Hotel, where high tea was served.

NOTES AT THE LAUNDRY EXHIBITION.

THE fourth annual Laundry and Sanitary Exhibition, now open at the Agricultural Hall, Islington, is undoubtedly the best of its kind that has hitherto been held. Its interest for us lies principally with the sanitary goods exhibited, and of these it must be confessed there is but an inadequate show. The excellence of the few exhibits which do relate to sanitation, however, are sufficient to redeem the title in some measure. It is essentially a laundry exhibition. There are very many of the leading types of washing machines, hydro-extractors, ironers, &c., and quite a large exhibition of different kinds of washing compounds, soda, starch, and the like; whilst vans and laundry accessories of every description are well in evidence.

It does not lie within our province to give particulars concerning the whole of the machinery and sanitary exhibits, but the following attracted our attention in going round:

The Farnley Iron Company, Limited, of Leeds, have two large stands with several examples of their fire-clay goods, including glazed bricks, porcelain ware, tiles, &c. A wall has been temporarily put up, and gives a good idea of the appearance of the materials. The bricks are practically non-porous, and those we inspected were of excellent quality. Glazed sinks and wash-tubs of divers patterns and sizes, as shown here, are bound to supersede the old-fashioned wooden tubs, and are eminently more suitable for laundry work on sanitary grounds. A number of earthenware pipes, arrangements for urinals and closets, lavatory sets, and baths, are also shown.

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SIR,—Relying on our personal knowledge of each other (now of many years standing) I do not hesitate to write these lines in justice to my colleagues and myself as chairman of the Competitions Committee of the Royal Institute of British Architects, as I feel certain there is no one who would be more anxious than yourself to correct any mis-statements which you may inadvertently have made. There are several in your editorial paragraph on the above competition in your issue of the 22nd inst.

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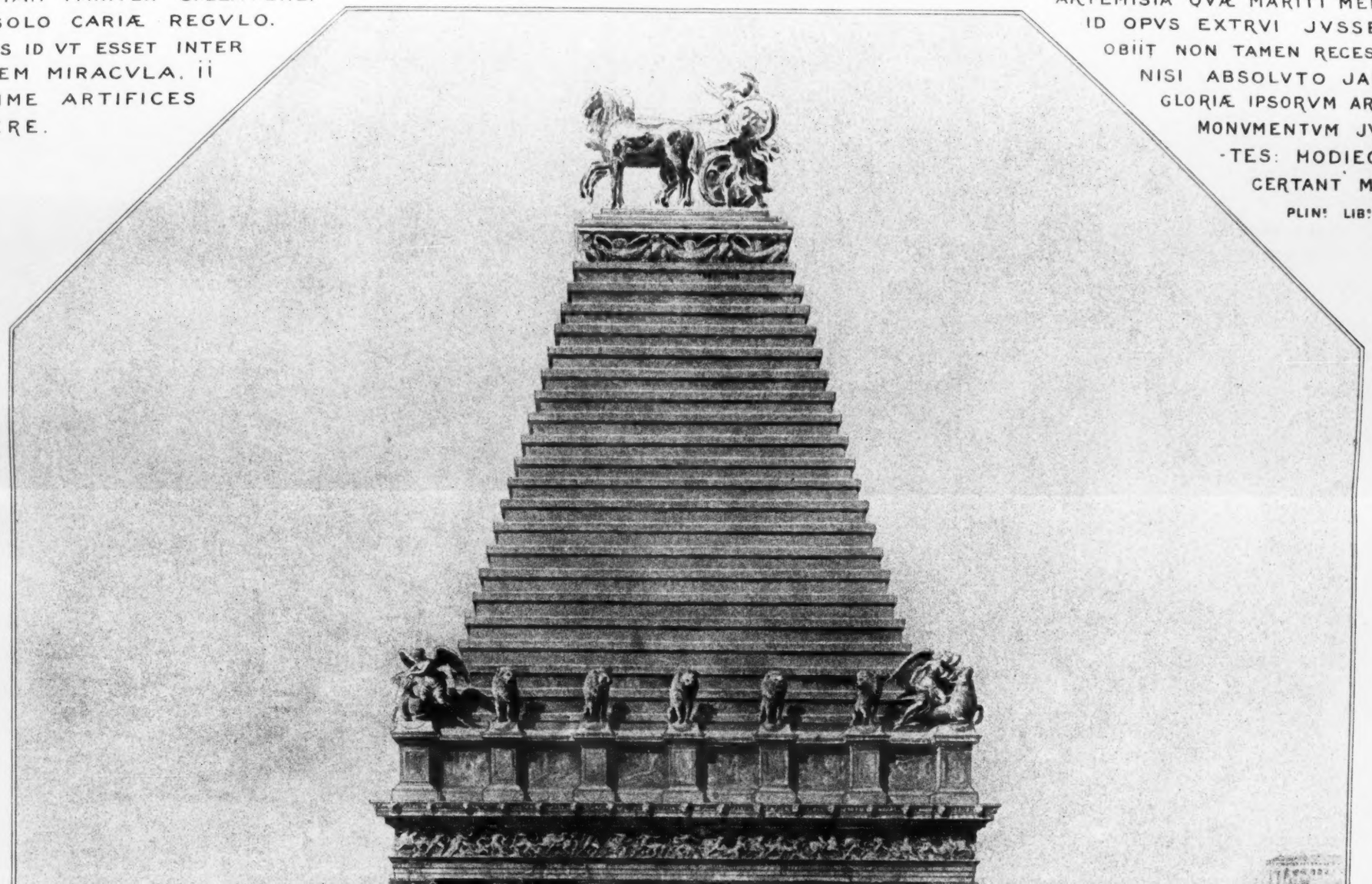
JAMES DREDGE,
Executive Commissioner, British Section.
35, 36, Bedford-street, Strand, London, W.C.

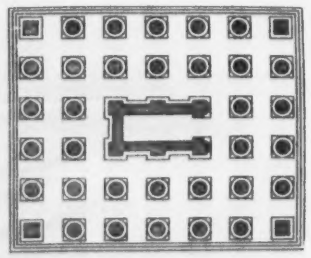
SCOPAS HABVIT ÆMVLOS
BRYAXIN. ET TIMOTHEVM. ET LEOCHAREM. DE QVIBVS SIMVL DICENDVM EST.

QVONIAM PARITER CÆLAVERE.
MAVSOLO CARIÆ REGVLO.
_OPVS ID VT ESSET INTER
SEPTEM MIRACVLA. II
MAXIME ARTIFICES
FECERE.

ARTEMISIA QVÆ MARITI MEMORIÆ
ID OPVS EXTRVI JVSSERAT.
OBIIT NON TAMEN RECESSERVNT,
NISI ABSOLVTO JAM. ID
GLORIÆ IPSORVM ARTISQVE,
MONVMENTVM JVDICAN-
-TES: HODIEQVE
CERTANT MANVS.
PLIN! LIB! XXXVI.



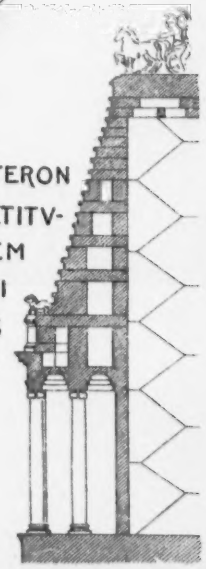
CINGITVR COLVMNIS
TRIGINTA SEX.
PTERON VOCAVERE.



PATET AB AVSTRO ET SEPTENTRIONE
XIII PEDES. BREVIVS A FRONTIBVS.

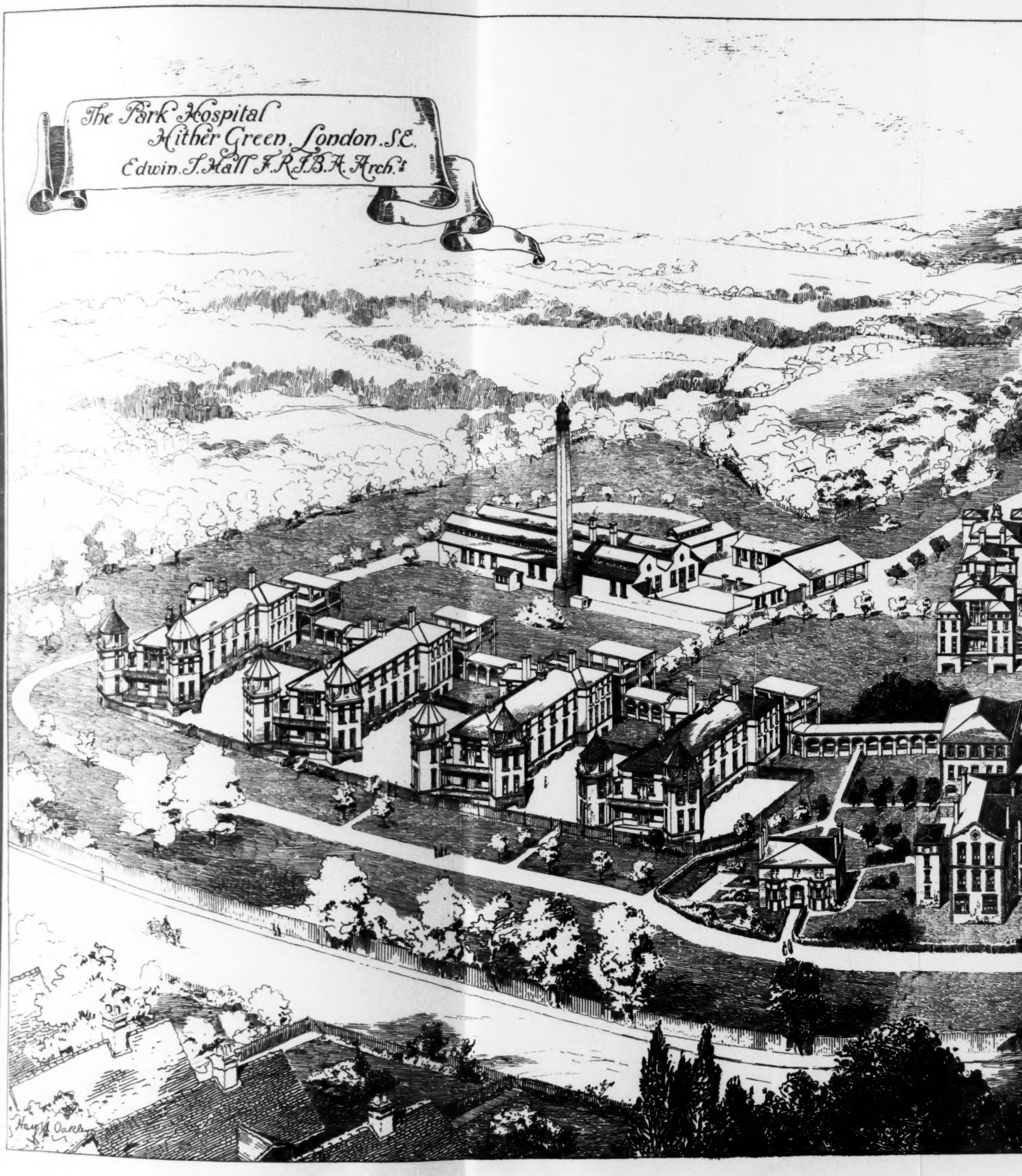
AERE NEC VACVO PENDENTIA MAVSOLEA
LAVDIBVS IMMODICIS CARES IN ASTRA FERANT.

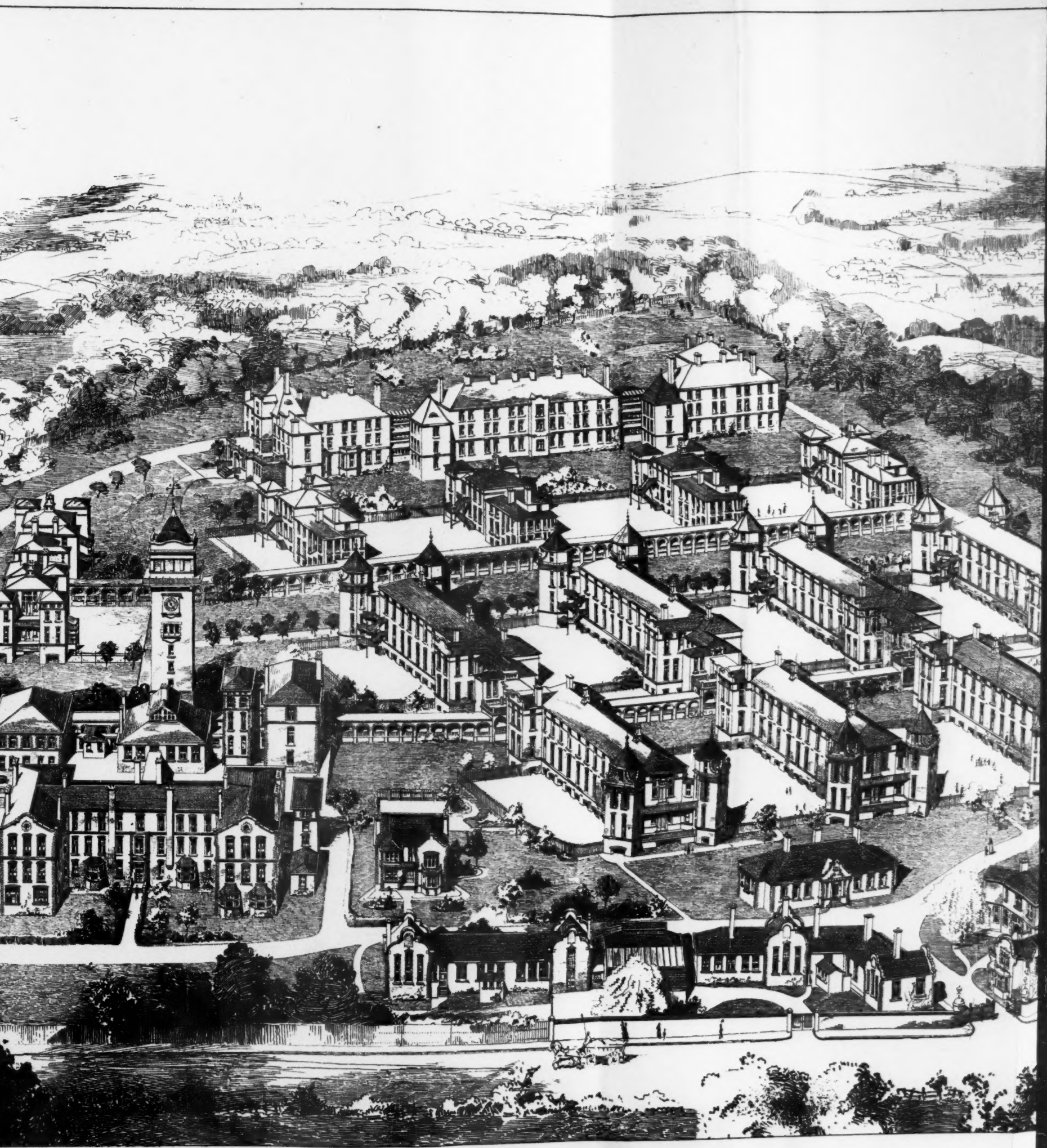
SVPRA PTERON
PYRAMIS ALTITV-
-DINE INFERIOREM
ÆQVAVIT. VICINTI
QVATVOR GRADIBVS
IN METÆ CACVMEN SE
CONTRAHENS.
HÆC ADJECTA CENTVM
QVADRAGINTA PEDVM
ALTITVDINE TOTVM OPVS
INCLVDIT



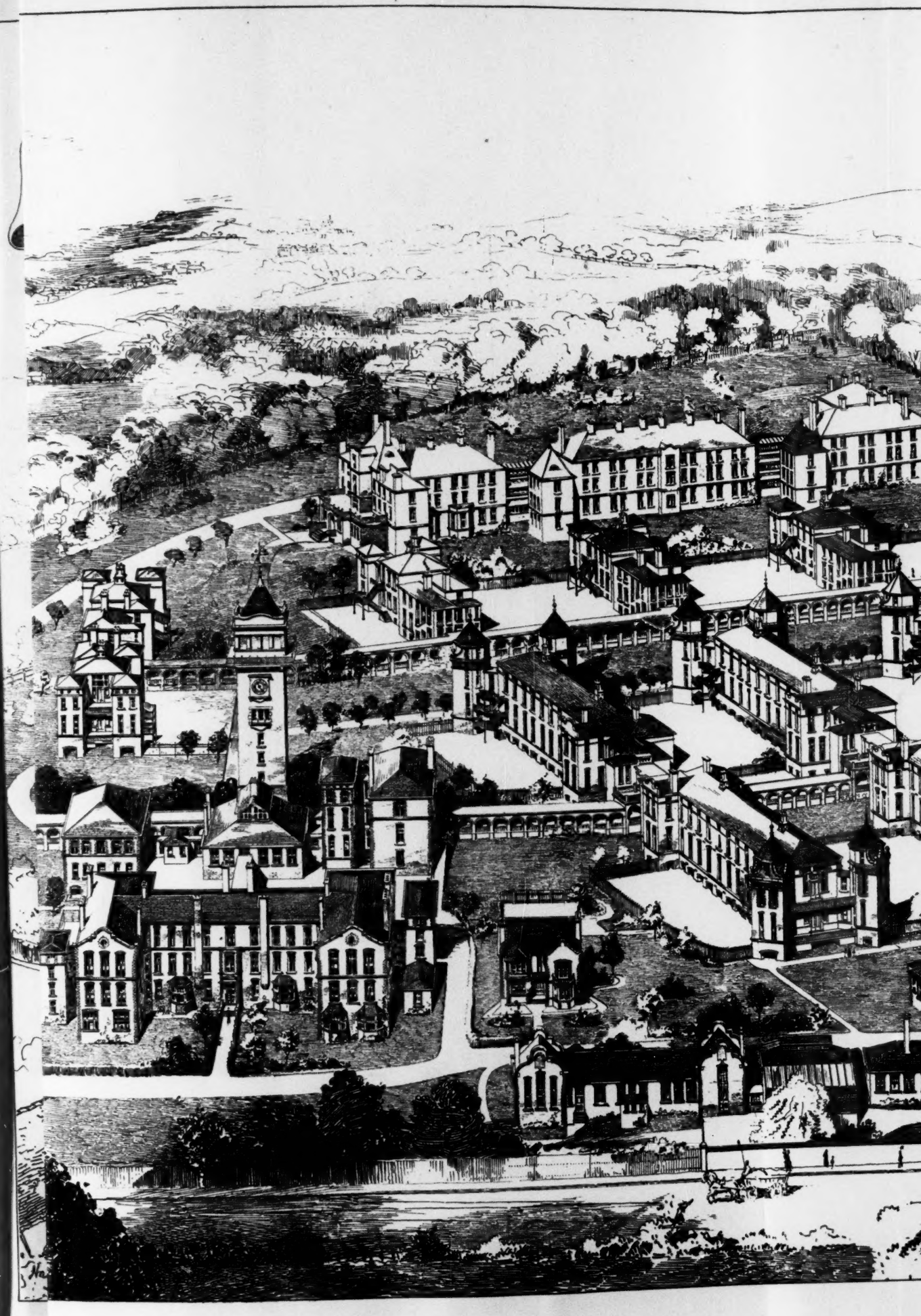
RESTORATION OF THE MAUSOLEUM AT HALICARNASSUS.—By the Late Professor Cockerell.

IMP. PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.


The Park Hospital
Hither Green, London. S.E.
Edwin. T. Hall F.R.I.B.A. Arch.t
Harold Oakley



THE PARK HOSPITAL: GENERAL VIEW.—Mr. Edwin T. Hall, F.R.I.B.A., Architect



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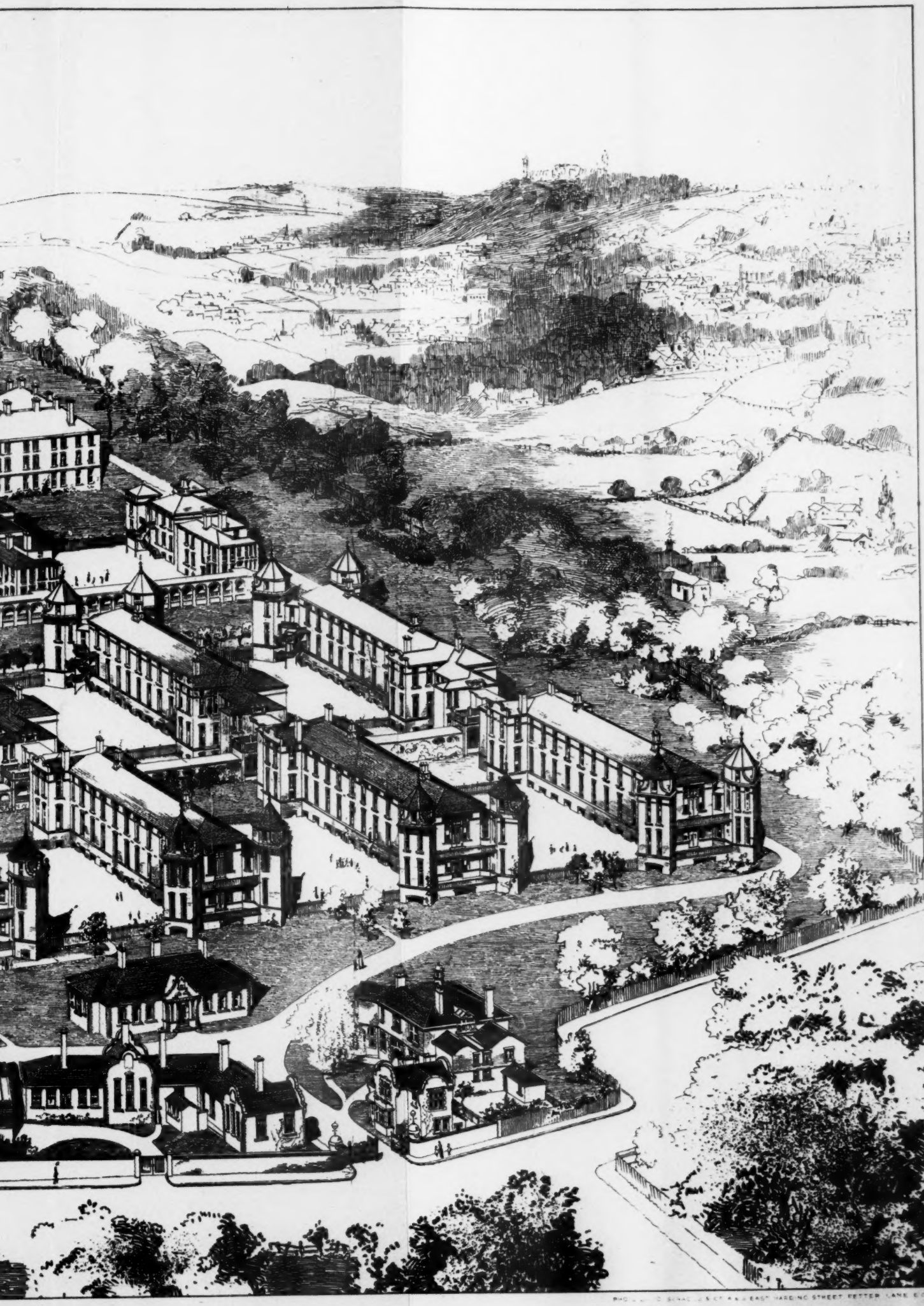
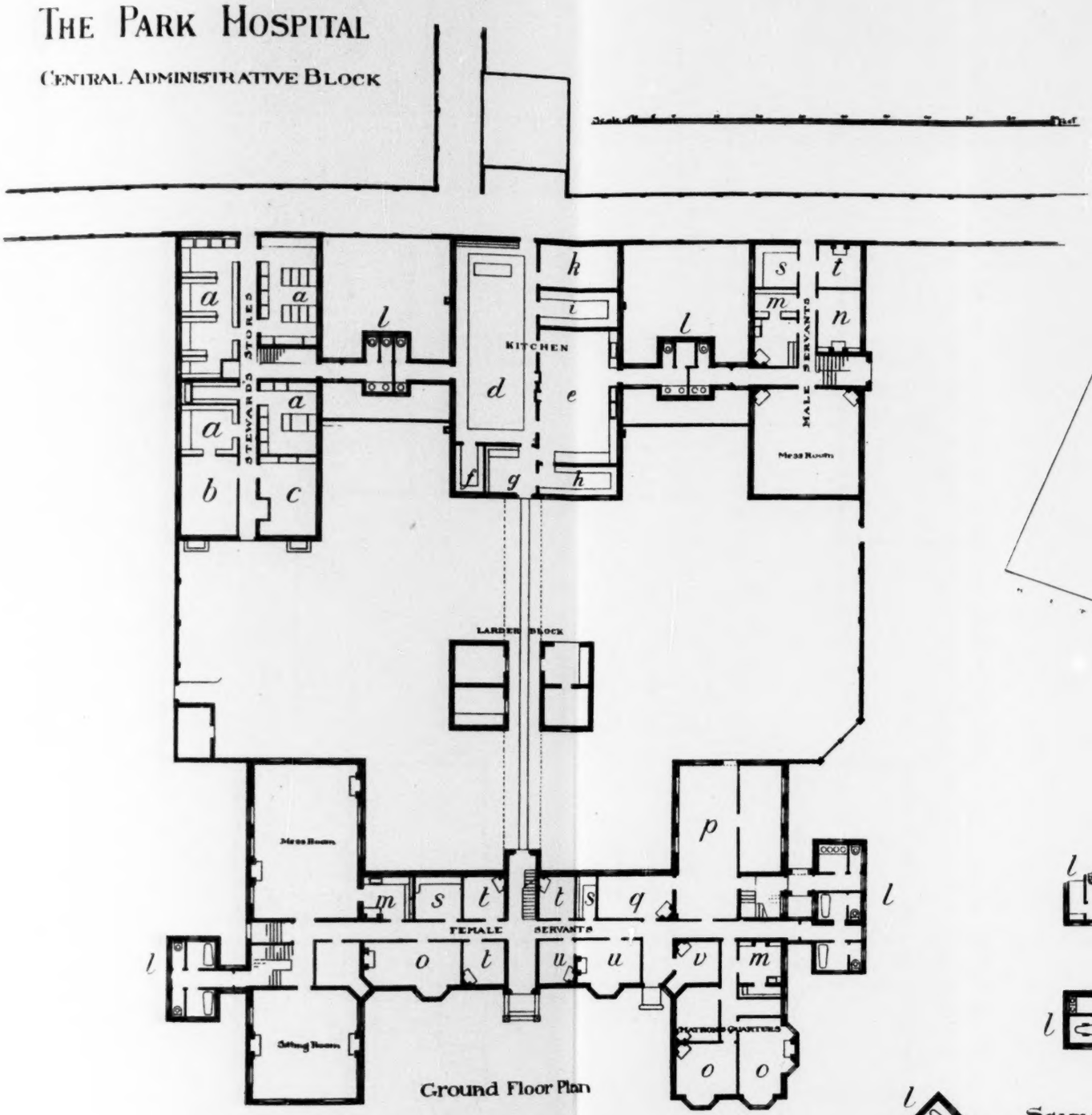


PHOTO-LITHO BY SHARLAND & CO. 4 & 5 EAST HARDING STREET FETTER LANE E.C.

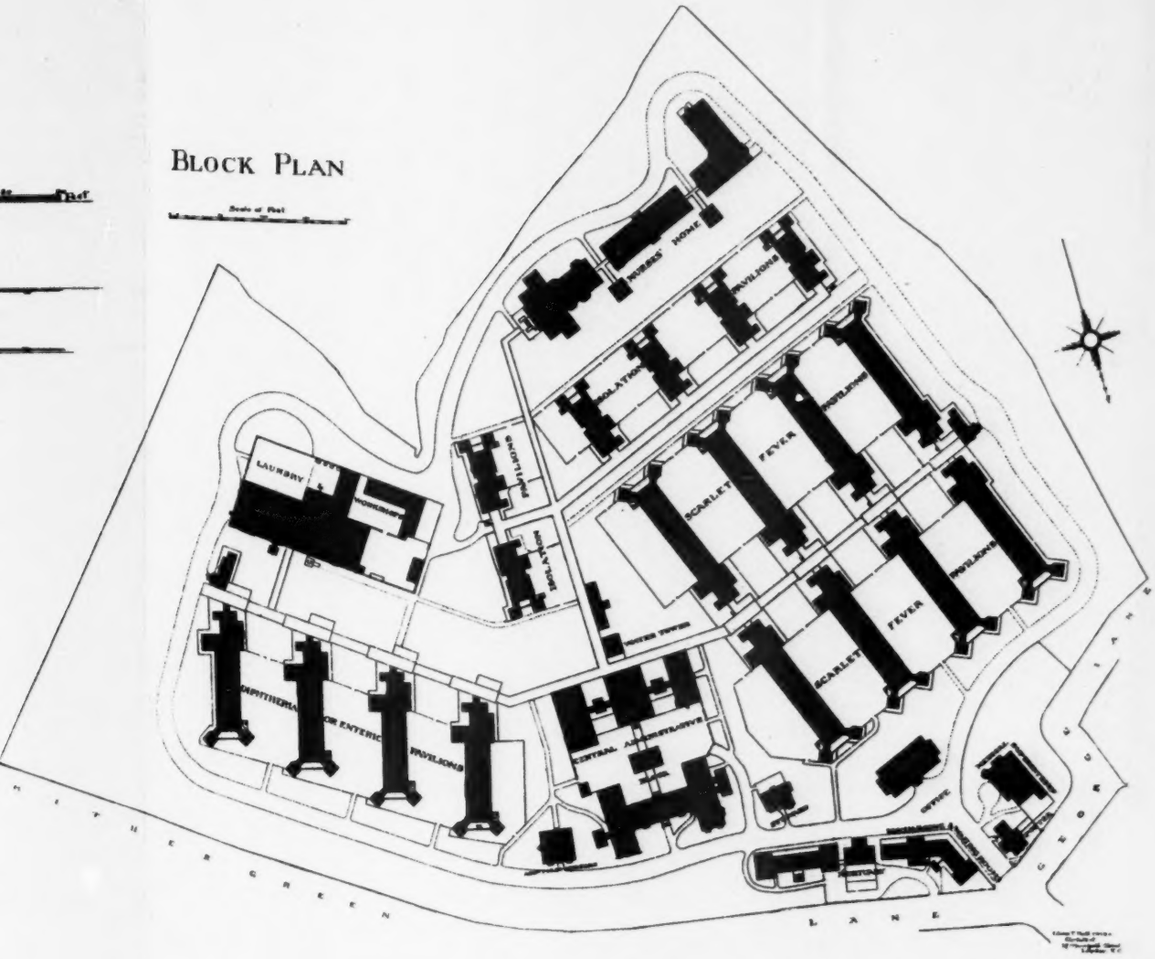
THE PARK HOSPITAL

CENTRAL ADMINISTRATIVE BLOCK

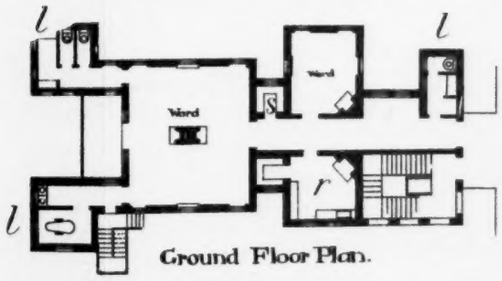


a.—Steward's Stores.
b.—Steward's Office.
c.—Clerk's Office.
d.—Kitchen.
e.—Scullery.
f.—Bread Store.
g.—Weighing Room.
h.—Vegetable Store.
i.—Cooked Meat Larder.
k.—Cook's Mess Room.
l.—Lavatories, W.C.'s, &c.
m.—Scullery Stores, &c.
n.—Superior Servants' Mess-room.
o.—Sitting Rooms.
p.—Work Rooms.
q.—Matron's Office.
r.—Ward Kitchens.
s.—Stores, &c.
t.—Bed Rooms.
u.—Housekeeper's Rooms.
v.—Waiting Room.

Block Plan



Isolation Pavilions



Scarlet Fever Pavilions

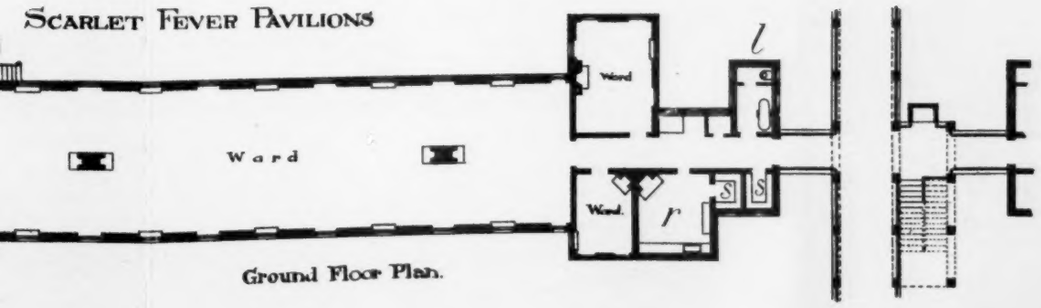
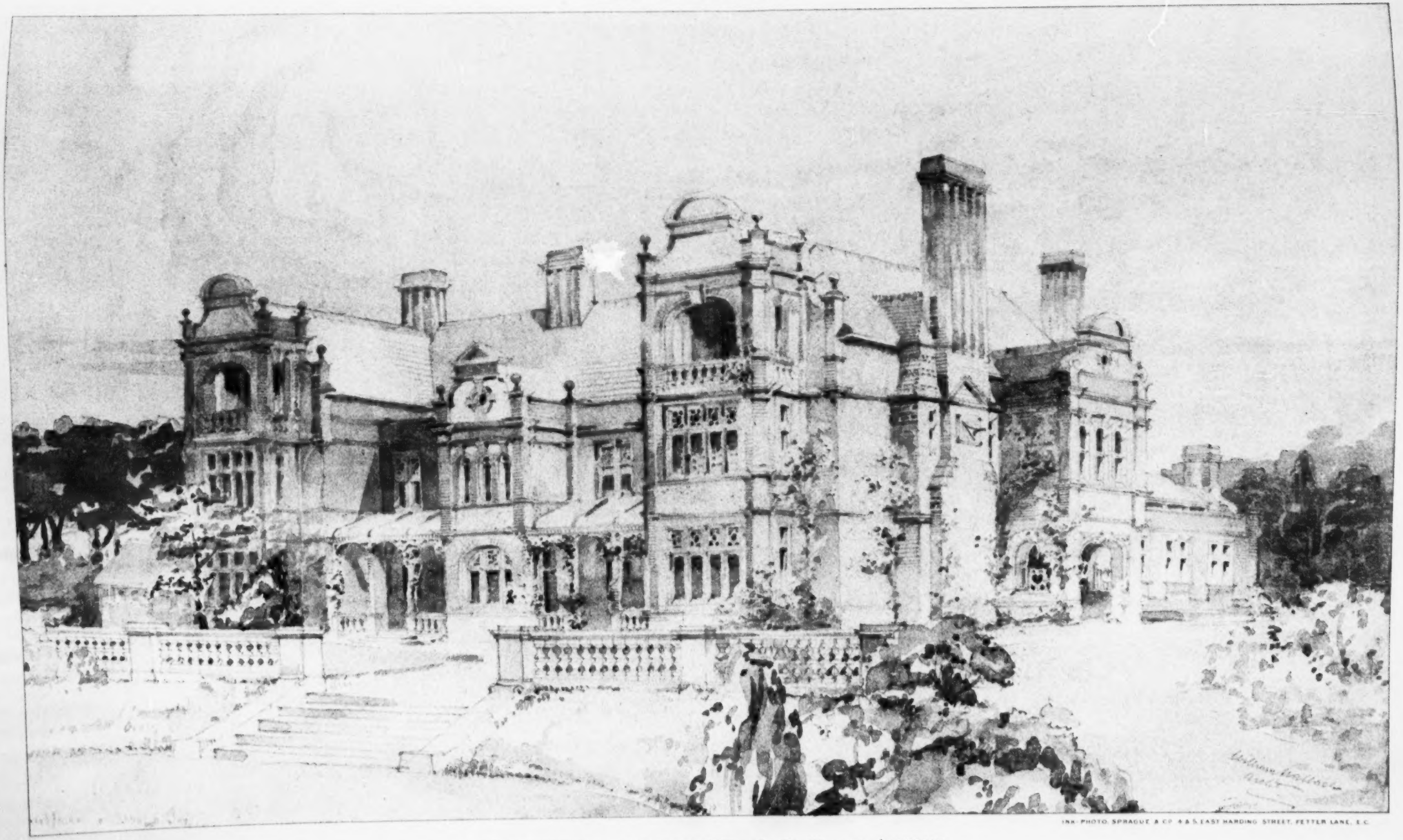


PHOTO-LITHO. SPRAGUE & Co. 4 & 5 EAST HARDING STREET FETTER LANE E.C.

IN T. HALL, F.R.I.B.A., ARCHITECT.

NEW FARMHOUSE:
ORCHARDLEIGH: SOMERSET:
B. Vaughan Johnson: Architect

PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.



INK-PHOTO, SPRAGUE & Co., 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

"BROWNSWOOD," ENNISCORTHY.—Mr. W. Wallace, Architect.

"BROWNSWOOD," ENNISCORTHY, IRELAND.

THIS residence, now completed for the Baroness Gray, is really an extensive addition to the original house, which was a plain, square, rough-cast building (with a door in the centre and windows on each side, a type of house common to that part of the country). Owing to the nature of the site, it was found best to retain the old house as a centre and add wings on either side; this was also desirable from the fact that the house has one of the finest and most extensive views in the country, and it was a great matter to have all the principal rooms commanding the view. The arched recesses on the top of each gable are also designed especially for the view.

Unfortunately, the plan was not sent to us in time for publication. The principal feature is the large hall and staircase (which occupies the position of the old courtyard). The principal entrance is now in the end, being more sheltered than the front—the old front entrance is now the garden entrance. The two front rooms of the original house are now the library and ante-drawing room, and the two large bays at each end are respectively the dining room and drawing room.

The general walling is rough cast, with Dumfries stone dressings and red brick. The roofs are covered with Broseley tiles.

All the works have been carried out from the designs of Mr. William Wallace.

COMPETITIONS.

CENTRAL FIRE ENGINE STATION, ABERDEEN.—The tender of Messrs. Gall & Walker, Aberdeen, for the mason work of the new police workshops in King-street, amounting to 1,312*l.* 19*s.* 6*d.*, has been accepted by the Town Council. The burgh surveyor (Mr. W. Dyack) will carry out the joiner work by workmen employed by the Council. As regards the central fire station to be erected on the remainder of the Council's ground at King-street, it has been resolved to invite competitive designs from local architects—first premium, 50*l.*; second, 25*l.* If the first design is carried out, the premium in that case will merge in a commission of five per cent. on the cost of construction of the building. The total cost of the two buildings will be between 15,000*l.* and 16,000*l.*

ARCHITECTURAL SOCIETIES.

NORTHERN ARCHITECTURAL ASSOCIATION.—On the 22nd inst. an excursion visit was made to Darlington by a good gathering of the members of this Association. The party was met at Bank Top Station by Mr. G. G. Hoskins, a past President of the Association, and after some time spent at St. Cuthbert's Church and the Free Public Library, inspections were made of buildings now being carried out in accordance with the designs of Mr. Hoskins, and comprising the new offices for the Darlington Guardians, the Technical College, and the new business premises of the North of England School Furnishing Company, Limited, the terra cotta used in all these buildings being greatly approved of. The visit concluded with an inspection of the recently-erected King's Head Hotel, where high tea was served.

NOTES AT THE LAUNDRY EXHIBITION.

THE fourth annual Laundry and Sanitary Exhibition, now open at the Agricultural Hall, Islington, is undoubtedly the best of its kind that has hitherto been held. Its interest for us lies principally with the sanitary goods exhibited, and of these it must be confessed there is but an inadequate show. The excellence of the few exhibits which do relate to sanitation, however, are sufficient to redeem the title in some measure. It is essentially a laundry exhibition. There are very many of the leading types of washing machines, hydro-extractors, ironers, &c., and quite a large exhibition of different kinds of washing compounds, soda, starch, and the like; whilst vans and laundry accessories of every description are well in evidence.

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JAMES DREDGE,
Executive Commissioner, British Section.
35, 36, Bedford-street, Strand, London, W.C.

CAN THE COUNTY COUNCIL SUMMON?

Sir,—Mr. Hodge has not made a very close study of the Building Act. Section 159 reads thus: "The Council may in any case where they shall think fit so to do, undertake on behalf of a District Surveyor any proceeding which would otherwise be undertaken by such District Surveyor." This clause is very plain. District Surveyor.

The Student's Column.

RURAL DRAINAGE.—IX.

VARIOUS materials have been employed in the construction of sewers, amongst which may be mentioned — stone, brick, concrete, stoneware, earthenware or fireclay, and iron. The form of sewers has been still more variable than the material, including the square, rectangle, circle, ellipse, and several combinations of these figures. Again, sewers may be constructed either continuous as in the case of brickwork, or sectional as in the case of stoneware pipes.

Whatever may be the material or form employed in the construction of a sewer the following requirements must be fulfilled:—

1. Impermeability.
2. Strength to withstand the pressure of superincumbent earth, shocks, &c.
3. Smooth internal surface to minimise friction.
4. Non-liability to be affected chemically by the action of the sewage or gases.
5. Non-liability to abrasion.
6. Easy to construct or lay and joint.

In the earlier days of sewer construction the principle of "self-cleansing" was unknown, and consequently the dimensions, form, and material were selected chiefly with a view to providing means of access in order to remove the accumulated deposit when the sewer had become choked. The effect of this was to cause sewers to be constructed in a manner most favourable to deposit and most unfavourable to self-cleansing. By the introduction of stoneware drain-pipes in 1846, the practicability of rendering a sewer self-cleansing and at the same time considerably reducing its dimensions was proved.

The most common description of channel for the conveyance of sewage or surface water found in rural districts is the rubble drain, or stone-drock, or gout. These consist of rubble walls laid dry or in mortar, and covered with stone flags. Sometimes the bottom is flagged, or laid with rubble or brick, on edge, and occasionally the crown is arched.

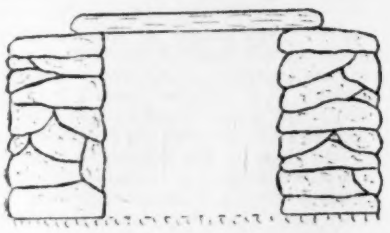

Fig. 4.

It is hardly necessary to say that this form of drain is absolutely unsuited for the conveyance of sewage. Percolation must take place, allowing of the escape of liquid, and causing the solids to be deposited, ultimately choking the sewer. The rough and irregular internal surfaces facilitate deposit, and check the flow. The flow is also retarded on account of the large proportion which the wetted perimeter bears to the sectional area of the liquid. Channels of this description, although totally unfitted for the conveyance of sewage, may, where pre-existent, be usefully employed for the removal of surface water.

In rural districts, where small volumes of sewage have to be dealt with, glazed stoneware pipes are almost universally employed for the purposes of sewage, channels of other materials being used only in special cases. The early practice of constructing sewers of inordinate size has been already alluded to, and its evil results pointed out. The abandonment of these "elongated cesspools" was largely due to the indomitable energy of the late Sir Edwin Chadwick, who demonstrated the considerable carrying power of smooth pipes. The tendency even now is to construct sewers of unnecessarily large dimensions, and it is extremely difficult to make people believe in the greater efficiency of smaller channels. A startling instance of the capacity of small pipes was given by Mr. H. J. Marten, M.I.C.E., in his address given at the Congress of the Sanitary Institute at Worcester in 1889:—"I have for several years past, without stoppage or inconvenience, been passing by gravitation, up hill and down dale, the whole of the sewage of Dudley, a town in this county containing nearly 30,000 inhabitants, through a pipe five miles in length and only 13 in. internal diameter."

The following details relating to stoneware and earthenware pipes are chiefly taken from Part III. of Rivington's "Building Construction":—

Ordinary glazed pipes are of two kinds:—1. Stoneware. 2. Earthenware or fireclay. "Stoneware pipes are made from the plastic clays of the 'Lias' formation, obtained chiefly from the South of England. They are burnt in domed kilns like fireclay goods, but at a very much higher temperature. A fractured surface shows that this ware is thoroughly vitrified throughout. It is intensely hard, dense in texture, close in grain, and rings well when struck." It possesses strength, durability, imperviousness, and resistance to destructive influences, mechanical and chemical, in a high degree.

Earthenware or fireclay pipes are made from the fireclays of the coal measures. This material has a very open grain, is porous except where protected by glazing, and is inferior to stoneware.

All stoneware or earthenware pipes should be glazed in order to render them impervious, to protect them from the chemical action of the sewage, and to give them a smooth surface so as to facilitate the flow of liquid through them.

Glazing is effected in two ways—viz., by the use of salt and lead respectively.

"Salt glazing is effected by throwing salt into the furnace when the articles it contains are at a high temperature. The heat of the fire volatilises the salt (chloride of sodium), the vapour, being in the presence of oxygen and silica, is decomposed, the chlorine goes off through the top of the furnace, the sodium combines with the silica in the clay to form silicate of soda, which again unites with the silicates of alumina, lime, or iron in the clay to form a surface coating of glass. This method of glazing has great advantages. The vapour of the volatilised salt gets into every crevice, however small, and coats it with an impenetrable film of glass.

Lead glazing is carried out by dipping the article to be glazed (after it has been once burnt) into a bath containing oxide of lead and tin, or borax with kelp, sand, &c., ground to powder and stirred in water to a creamy consistence. The particles of these different materials adhere to the surface of the article when it is dipped. It is then withdrawn and reburnt. The high temperature of the furnace causes the particles to run together, and to form a film of glass over the whole surface."

For good work only salt-glazed stoneware pipes of the best quality should be used.

Pipes are made from the material employed, very finely ground, washed, sieved, tempered, pugged, and forced by machinery through a mould, or dod, as it is called, dried and baked in a circular kiln.

"Sewer pipes should be of a vitreous imperishable material, of sufficient strength to resist fracture, having toughness enough to withstand shocks, tenacious, hard, homogeneous, impervious, uniform in thickness, true in section, perfectly straight longitudinally, or formed to the proper curve, uniformly glazed both inside and outside, free from fire cracks and flaws of all kinds. When struck they should ring clearly."

The following table is due to Mr. Baldwin Latham. ("Spec. for Bideford water-works." Humber.)

	Stoneware.		Fireclay.		Other Clays.	All Pipes.
Internal diameter. Inches.	Thickness. Inches.	Length in work. Feet.	Thickness. Inches.	Length in work. Feet.	Thickness. Inches.	Depth of socket. Inches.
2	—	—	—	—	5/16	—
3	3/8	2	3/8	2	3/8	1½
4	7/16	2	7/16	2	7/16	1½
6	7/16	2	7/16	2	7/16	1½
9	7/16	2	7/16	2	7/16	2
10	7/16	2	1	2	—	2
12	1½	2	1 1/10	2	1	2
15	1½	2	1½	2 to 3	1½	2½
18	1½	2 to 3	1½	2 to 3	2½	2½

The forms devised for sewer pipes are legion, the principal variation, however, being in the methods of jointing. The ordinary form is the socket pipe (fig. 5), in which one end of the pipe is expanded so that the opposite or spigot end of the next pipe may be inserted, and the space between the spigot and the socket filled with jointing material.

The Doulton self-adjusting joint is formed by the contact of two bands of composition cast one on the spigot and the other in the socket of the pipe. That on the spigot is of a spherical form and therefore admits of deflection (on the same

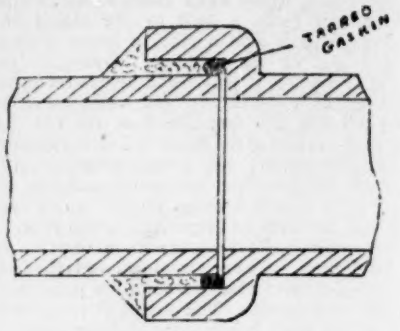

Fig. 5.

principle as a ball and socket joint). The lining in the socket is cylindrical—*i.e.*, of the same diameter throughout its depth. A partial withdrawal of the spigot, therefore, does not impair the joint.

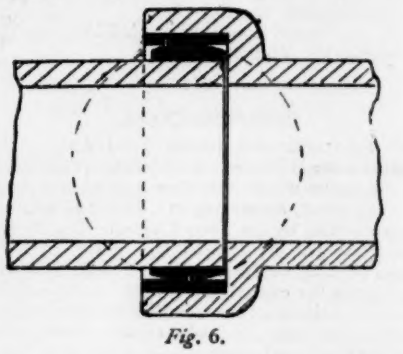

Fig. 6.

The method of jointing is as follows:—Wipe socket and spigot clean. The lubricant (supplied with the pipes) should be slightly warmed and applied evenly with a brush inside the socket of the pipe already laid and round the spigot of the following pipe. Press the pipe home and the joint is complete.

The advantages claimed for this form of joint are—flexibility, which allows of deviation or adjustment, and deflection being unaccompanied by fracture or leakage, the effects of settlement are rendered less serious; a more reliable joint can be made in water-logged ground.

The Doulton composite joint (fig. 7) is a

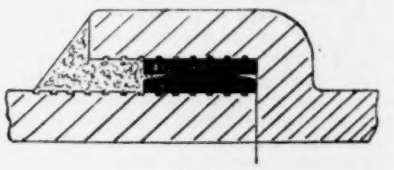

Fig. 7.

combination of the two methods, and consists of the original self-adjusting joint (as above described) attached to pipes with sockets of extra depth. The outer portion of the socket is left free from the bituminous lining, and provision is thus made for the addition of a Portland cement joint.

The Archer joint (fig. 8) is described as

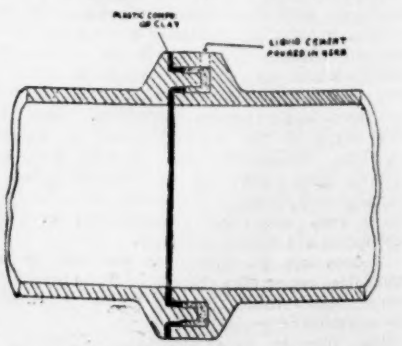

Fig. 8.

follows:—"A flat band of plastic compo or well-tempered clay is pressed against the face of the inner and outer flanges at the base

of the tongue while the pipe is on end—the tongue itself remaining undressed to come directly in contact with the liquid cement. The tongue end so dressed is tapped or levered home into the groove end with an iron bar against a block of wood at the opposite end of the pipe until the outer flanges nearly meet. In some cases the outer band of clay is pressed between the flanges after the pipes are laid. After each pipe is tapped home, the interior frill of clay in the joint is removed by a half-circle rake or by pulling with a connecting cord passed through the pipes during the process of laying a sack packed with shavings to the full diameter of the pipe. After a number of pipes have been joined, pour cream of cement (3 of pure Portland cement to 2 of water) into one of the holes in the socket."

Innumerable methods of jointing have been devised combining the principles illustrated above, and all have their advocates.

In the preceding chapter it was stated that "according to Justice Wil's in the case of Travis *v.* Uttley not only the portion of the channel beyond the point where it receives the drainage from the second house but the upper portion which receives the drainage of the first house only is a sewer." Justice Wills, in the course of his judgment in that case, said:—"This drain is used for the drainage of more than one building. It is, therefore, a sewer. It is impossible to say that the part which is used for the drainage of one building is a drain and the rest a sewer. The drain is a sewer from end to end."

In the recent case of the Beckenham Urban District Council *v.* Wood, the magistrates held, on the authority of Travis *v.* Uttley, that the part of the drain-pipe above the point where it drained more than one building was a sewer and not a drain. The Beckenham Urban District Council appealed against this decision, and the appeal was allowed. In this appeal, Justice Wills stated:—"If the expression attributed to me [in Travis *v.* Uttley] is understood to mean that a part of a system which ends in an undoubted sewer must necessarily be a sewer above the point where it becomes a sewer, I think that is erroneous, and I am not prepared to abide by any such general statement as that."

GENERAL BUILDING NEWS.

CHURCH OF ST. MARY, BIBURY.—At a bazaar held recently in the grounds of Bibury Court, Gloucestershire, a sum exceeding 300*l.* was collected towards the fund for repairing the parish church, which is one of the finest of its kind in the Cotswold district. The repairs, mainly to the roofs, have been carried out by Messrs. Collins & Godfrey, of Cheltenham and Tewkesbury, under the direction of Mr. Waller, Diocesan Architect. The total cost is about 1,700*l.* The nave, aisles, and tower roofs have been carefully repaired and restored, as much as possible of the old work, in oak and Spanish chestnut, being retained; the nave arcade and portions of the north and south walls have been reinstated. The nave roof has been tiled afresh, and the aisle roofs re-covered with new lead. Of Bibury Court, which stands close by, it is stated that one wing was rebuilt by Inigo Jones.

VILLAGE HALL, OVERBURY, WORCESTERSHIRE.—A Village Hall has just been opened at Overbury. A porch occupies a central position in the front of the building. The chief room of the building is 60 ft. long by 20 ft. wide, and is lighted by one large window at the end opposite the platform, and also by three large windows on each side of the roof, which is supported by a framework of memel deal. The room is panelled all round to a height of 5 ft. with the same kind of wood, and has a board floor in which a narrow grating, in connection with the heating apparatus, runs round the room. The stage communicates with all the other rooms. To the right, on the ground floor, is a room 18 ft. square, which will be used as a library and reading-room. It is lighted by a large window facing the road, and in the sill is an oak pillar support, as is the case in all the lower windows. On the left of the stage is the smoke and games room for the Working Men's Club. This room is exactly the same size as the library, and has a large window looking over the bowling green at the rear. At the back of the stage are passages connecting the lower rooms, and a kitchen 16 ft. square. A small apartment is devoted to the heating apparatus, and there are also lavatories on the ground floor. Upstairs there is a small lumber room over the smoke-room. In the lower apartments, with the exception of a large room, the floors are of narrow blocks of wood. Mr. Norman Shaw was the architect of the building.

BOARD SCHOOL, CARLISLE.—A Girl's Board School was recently opened in Brook-street, Carlisle, by the Mayor, Mr. Crowder. In addition to the girl's department there has also been added to the existing schools a cookery school with covered playground below, and the infant's department has been enlarged by the addition of a new class-room and cloak-room, affording accommodation for seventy-eight more infants. The cost of these additions has been 5,217*l.* The new department has been erected at the Brook-street end of the site purchased a few years ago, and comprises a large schoolroom divisible into three class-rooms for sixty children each, flanked on the Edward-street side by two and on the Howe-street side by one class-room, access to the whole being gained through vestibules, one of which communicates both with the street and playground and the other with the playground only, a cloakroom being provided contiguous to each. All the three class-rooms are capable of seating sixty girls. A new arrangement of screens, designed by the architect, will also allow the main portion of the building to be converted in a few seconds into one large hall for special requirements, educational or otherwise. The school has been built to correspond in appearance with the boys' and infants' schools erected some four or five years ago. The cloak rooms, lavatories, teachers' room, &c., are disposed on the playground side of the schoolroom. The angular form of the site renders the shape of the two lobbies irregular. Special attention has been given to the arrangements for ventilation and heating, and the most modern sanitary appliances have been adopted. The floors throughout are laid with wood blocks, slightly raised galleries being formed for the desks. The cookery school has a fireproof floor and staircase over the covered playground below. Mr. T. Taylor Scott has prepared the designs for the whole of the schools, and the work has been executed under his superintendence by the following contractors:—Builders, Messrs. W. & H. Davidson; joiner, Mr. W. Latimer; slater, Mr. J. Hewitson; plumbers, painters, and glaziers, Messrs. R. M. Hill & Son; plasterers, &c., Messrs. R. M. Ormerod & Son. The heating and ventilating appliances were supplied by Messrs. E H. Shorland & Brother, of Manchester.

A CRYSTAL PALACE FOR NEWCASTLE.—Several Newcastle gentlemen, it is stated, are forming a syndicate to acquire the land upon which it is intended to erect a building 400 ft. long by 120 ft. broad, with side galleries, capable of accommodating upwards of 20,000 persons. In addition to this there will be the usual cloakrooms, offices, refreshment and smoke rooms on the same floor. The great organ will occupy the west end. It is proposed to utilise the space underneath as an ice palace and promenade, the whole being lighted up by electricity and fairy lamps on the lines of the London Olympia. Mr. J. W. Taylor, of Newcastle, is the architect.

CHURCH CONGRESS HALL, SHREWSBURY.—The hall which is being specially built for the Church Congress, is situated in the Quarry, Shrewsbury. It has been built from designs by Mr. A. E. Lloyd Oswell, architect, of Shrewsbury, by Mr. C. R. Clark, contractor, of Stoke-on-Trent. It will accommodate 2,500 persons, the centre of the hall being furnished with chairs, and the sides are raised as galleries and benched. Under the speakers' gallery are committee and retiring rooms.

DWELLINGS FOR THE WORKING CLASSES, ABERDEEN.—The Town Council propose to acquire an acre of ground at Balmoral-road for the erection of twenty-six two-story cottages for the working classes, according to sketch-plans by Mr. John Rust, jun., City Architect, who has been instructed to prepare working plans and procure tenders from contractors.

NEW PREMISES, PLAISTOW.—To commemorate the enlargement and partial rebuilding of their printing-offices in North-street, Plaistow, Messrs. Curwen's gave a supper on the 14th inst. The builders, Messrs. J. Outhwaite & Son, and their workmen, were invited to meet Messrs. Curwen and their workmen, and a party of nearly a hundred sat down together in one of the new workshops. The room selected was one which was originally the old chapel, now transformed into a compositor's room. Mr. W. T. Walker was the architect and Mr. Chas. Cropley was builder's foreman.

CHURCH, LLANWRTYD WELLS.—Archdeacon Bevan, on the 19th inst., opened the new church dedicated to St. James. The church has been chiefly built by local workmen, in the Early Geometrical style, and consists of a nave 58 ft. long by 25 ft. wide, with a porch 8 ft. by 7 ft. at the western extremity of the south side. The chancel, including the choir, is 26 ft. long by 19 ft. 6 in. wide, with a vestry on the north side 14 ft. by 10 ft. There are chairs for 226 worshippers. The walls are built of local pebble-stone in flint work. The roof is covered with Portmadoc blue slates and Ruabon red ridgings and crosses. The contractor for these was Mr. William Thomas. The dressings are of red sandstone. The contractor for this work was Mr. Thomas Barker. The roof is open timbered, slightly stained and sized. The contractors for the carpenter and joiner's work were Messrs. Samuel Williams & Son. The walls are internally finished in warm-tinted stucco with cement dado. The porch, nave, alleys, and choir floors are laid with tesselated tiles, and the chancel with encaustic, supplied by Messrs. Mansfield Brothers, Church Gresley. The contractor for these was Mr. John Richards. The windows are glazed with square and lozenge mixed cathedral tinted glass by Mr. Samuel Evans, Birmingham. The hinges and other wrought iron work were wrought by Mr. Evan Jones, smith, and the locks, latches, &c., by Messrs. Alfred Gardiner & Sons, Bristol. The painting was by Mr. John Graham, and the staining and sizing, &c., was by Mr. Richard Williams, Llandilo. The pulpit, reading-desk, altar rails and altar, were supplied by Mr. Benjamin Jenkins, and the font was executed by Mr. William Williams, monumental mason, Llandilo. The whole has been carried out from the designs and under the superintendence of Mr. David Jenkins, architect, Llandilo.

NEW PREMISES, CORK.—The "Clancarty Buildings," in Old George's-street, Cork, for Messrs. J. McCarthy & Sons, Limited, have just been completed. The façade is 54 ft. long and 48 ft. high, divided into four stories, with round-headed windows. The basement is fireproof, the walls being built of brick and cement, whilst the ceiling and floor over are composed of concrete. The first, second, and third floors immediately overhead are altogether occupied by the firm as warerooms. Each floor, in addition to the ordinary stairs, is approached by a lift, manufactured and fixed by Messrs. Waygood, of London. The work has been designed by Mr. W. H. Hill, of Cork, and carried out under his superintendence by Messrs. John Delaney & Co. An electric installation is at present being fixed for illuminating the entire establishment, while a gas-engine is in course of erection for working the lifts and machinery used in the tea and wine departments. Messrs. Handley & Shanks, electrical engineers, have been entrusted with this portion of the work.

ST. MARY'S CHURCH SCHOOL, MONMOUTH.—The work of restoration which has been going on at this school for the past few months is now practically completed, and the school was reopened on Monday. The renovation has almost amounted to a rebuilding, and there is seating accommodation for about 250 boys. Great care has been taken to preserve the ancient window, known as Geoffrey's study window, intact. The builder was Mr. O. Parry, Monmouth; and the architect Mr. Halliday, Cardiff.

THE BLACKPOOL BIG WHEEL.—Although not complete in every particular, the large wheel at Blackpool was formally opened recently. The wheel was designed by Mr. Cecil Booth.

CHURCH, CARLTON-IN-CLEVELAND.—The foundation-stone of a new church was laid, on the 20th inst., at Carlton-in-Cleveland, by Mrs. Reeve. It replaces the old edifice burnt down some fifteen years ago. The new church is to be a larger one in early fifteenth-century Gothic, and will have oak ceilings and fittings. The walls are being built of local freestone given by Lord Faversham. It is to seat 140 persons, and the edifice will cost 2,000*l.* Mr. Temple Moore, London, is the architect, and Mr. R. Brotton, Bilsdale, contractor.

BUSINESS PREMISES, DUBLIN.—New business premises for Messrs. Carson Brothers, Grafton-street, Dublin, have just been opened. The building is of red brick and Irish cut granite, surmounted by a cupola of carved stone, while the woodwork is polished mahogany, carved. The work was carried out by Messrs. Farquharson, builders, under the personal supervision of the architect, Mr. Mitchell, Dublin.

TECHNICAL SCHOOL, MAIDENHEAD.—A new technical school has just been opened at Maidenhead. The architect was Mr. E. J. Shrewsbury.

IMPROVEMENTS TO PARISH CHURCH, IRTHINGTON, CUMBERLAND.—A bazaar was recently held in the Board School, Irthington, in order to raise funds for carrying out work of church improvement. The improvements will include the reseating of the church in oak. A new vestry will be built, and a fresh system of heating will be introduced. Mr. T. Taylor Scott is the architect, and the tenders have been accepted as follows:—Building, masonry, and slating, Mr. Mark, Laversdale Lane End; plumbing, Mr. Henderson, Carlisle; reseating, Mr. Head, Manchester; painting, Messrs. Atkinson & Elliot, Brampton; joiner work, Messrs. Hayward & Edgar, Brampton.

SCIENCE SCHOOL, WEDNESBURY.—On the 12th inst. a Science School was opened at Wednesbury. It faces Holyhead-road, being situate between the post-office and the School Board offices. The materials used are red brick with facings, and the inscription, "Science School," over the main doorway, is in terra cotta. The ground floor is occupied with the entrance vestibule; an exhibition-room, in which it is proposed to exhibit specimens of the manufactures of the town; and a metallurgical laboratory, with furnace-room attached, having appended to it a balance-room, stores, lavatories, &c. The rapid fall in the direction of Albert-street at the back has been utilised for workshops, stores, and a second entrance, under the ground floor. Above the exhibition-room and metallurgical laboratory are placed the chemical laboratory, a lecture-hall, class-room, balance-room, stores, and a teachers' preparation class-room. An effect has been obtained by the insertion of four stained-glass windows. Two of these are in the exhibition-room—one representing a laboratory, and having the portraits of Lord Kelvin, Faraday, Davy, and Roger Bacon in medallions; and the other representing a blacksmith at work, and having in the margin portraits of Stephenson, Bessemer, Watt, and Siemens in medallions, corresponding with those in the other window. The

two others are in the lecture-hall on the upper floor. One represents a working colliery (the Sandwell), and has in the margin designs emblematical of geography and astronomy. The other portrays the Willingsworth iron furnaces in the centre, with emblems of chemistry and mechanics in the top corners. Hot-water pipes and radiators are laid on all over the building. The total cost of the structure and furniture will be upwards of 2,000*l*. Mr. C. W. D. Joynson, architect, Wednesbury and Darlaston, furnished the plans and superintended the work of erection, which was carried out by Mr. Thomas Tildesley, Willenhall.

Town Hall, Hunstanton.—A new Town Hall has just been opened at Hunstanton. The building is situated next to the Golden Lion Hotel. Both buildings are constructed mainly of the brown Carr stone raised in the district. The main entrance is by a broad flight of stone steps through an arched doorway into a vestibule, on either side of which are ladies' and gentlemen's cloakrooms and ticket office. Thence are two entrances into the large hall, which is 77 ft. long and 37 ft. 6 in. wide, with an open-timbered roof. There is a gallery at one end and a platform or stage at the other end, provided with retiring rooms. The windows are mullioned and transomed, and the walls have a dado of match-boarding to the window height. Crush doors are also provided, as also a separate entrance for front seats. The Council offices are approached by a side entrance in an octagonal annexe, and on the first floor is the Council Chamber. Adjoining it is the Clerk's office, and on the ground floor beneath are the Surveyor's office, &c. The heating is by hot water-pipes on the low pressure principle. The contractor is Mr. Golden Hipwell, of Wisbech. The architects were Messrs. George J. and F. W. Skipper, of Norwich.

Fire Brigade Station, Paisley.—The site for the new fire-engine station at Paisley is situated about the centre of the south side of Johnstone-street. The style of architecture is Baronial. The elevation to Johnstone-street has a frontage of 97 ft. Four fire-engine exits are on the ground floor, with segmental arches over same; also to the right is a door for main entrance to watch-room, telephone exchange, superintendent's room, and office; and on the left is a recreation-room and bath-room. The main portion of the front building is three stories in height, with side-wings four stories in height. The corner portion of the second story is the superintendent's house, having a stairway immediately connected with the engine-room. The remaining portion of this elevation provides accommodation for a staff of nine firemen. The corner of the building next to Prussia-street is four stories in height and is treated in a similar manner to the Johnstone-street elevation, and contains private entrance and stair to superintendent's house. To the rear of the main building is the stable, having accommodation for six horses. The back elevation shows the drying tower, 12 ft. square and 62 ft. high to wall head. Immediately adjoining this area are the boiler-shed and workshop, with a hay-loft above and store. As to the means of access to the different floors, after careful consideration the open verandah system was adopted as being the most suitable, with a covered stair-shaft, the first landing of which leads also to the roof of the stable, which can be utilised as a promenade and children's playground. The plans of the building were prepared by the Master of Works.

Catholic Church, Nenagh, Ireland.—The new Church of St. Mary of the Rosary was dedicated at Nenagh recently. The plans of Mr. W. Doolin, architect, Dublin, to whom the execution of the work has been entrusted, were selected in competition, Mr. Thomas Drew, R.H.A., being assessor. Mr. John Sisk, of Cork, has acted as builder. The total length of the building (internally), is 171 ft. 3 in.; total length of nave to chancel arch, 132 ft.; width between aisle walls, 61 ft. 3 in.; width between centres of arcade columns of nave, 32 ft.; width of aisles, 16 ft.; length of chancel, 39 ft.; width of chancel, 26 ft. The spire is about 199 ft. high from ground line to base of vane. The church is heated by Messrs. Musgrave, of Belfast, on a combined system of hot air at the entrance and high pressure hot water at the chancel. So far the decoration within is confined to stained glass, the "Rosary Window" containing a full representation of the Fifteen Mysteries, the work of Messrs. Early, Dublin. The windows of the side-chapels are by Messrs. Mayer, of Munich, while the side-lights of the nave, by various artists, are filled with representations of saints and doctors of Molua. On the west front only is there any attempt at sculptural display. For this work, as well as the organ gallery and sculptured decoration of the interior generally, Mr. John O'Connell, of Cork, has been responsible. The work connected with the side-altars and Communion rails has been executed by Messrs. Pearse and Sharpe, both of Dublin.

A Year's Building in Leeds.—The report of Mr. Davidson Hainsworth, Inspector of Buildings to the Leeds Corporation, has just been issued. It shows that during the year ended March 25 last, 1,681 houses were completed and certified for occupation, including 17 villa residences, 6 semi-detached villa residences, 429 through houses, and 1,229 back-to-back houses. During the year 918 miscellaneous buildings were completed, including one church, one chapel, three mission-rooms, one synagogue, seven schools, and three hotels and public-houses.

Railway Mission Hall, Colchester.—A hall has been erected near North Bridge, Colchester, for the purpose of the Colchester Branch of the National Railway Mission. The designs have been carried out by Mr. Beaumont, of Lexden. The structure is built of brick, with a roof and dado of pitch pine. It will seat 350 persons.

Bank, Bristol.—New premises for the Wilts and Dorset Banking Company are being constructed in Corn-street, Bristol. Having recently secured the premises of the Royal Insurance Company, these are now being re-modelled for banking purposes by the banking company. The ornamental front, which has been retained, is being cleaned and "fluated." The whole of the interior was cleared away. In the basement are now constructed a number of strong rooms—one large apartment divided into sections, one being lined with steel. The banking hall is approached from the street through an entrance corridor constructed of Ham-hill stone, the walls and ceiling being moulded. The measurement of the banking hall is 66 ft. by 38 ft. The ceiling is enriched with floral ornamentations, and from the centre rises a dome, 28 ft. in diameter, filled with glass. On the Commercial rooms side is a carved freestone fireplace, dating from the fifteenth century, removed from the opposite wall. The ceiling is painted an ivory-white colour, the upper parts of the walls of salmon hue, and a polished oak dado is carried up to a height of 8 ft. A straight counter of Spanish mahogany is to extend from the front entrance in a direct line to the opposite wall. Inside the counter the floor is to be of oak blocks, and outside tiles are to be laid in mosaic. A room, overlooking the street, for the manager, opening from the banking hall, is on the St. Augustine's side of the entrance. The lighting will be by means of gas and electricity combined, and the heating by hot water pipes. There are two floors above the entrance lobby and manager's room. The apartments on the first floor, together with those now used for banking purposes, are to be let out as offices, and the top floor will be occupied by the resident clerk. Mr. G. Silley, of London, is the architect, and Mr. C. A. Hayes, Bristol, is the contractor.

Proposed Town Hall, Ossett.—It is proposed to erect a new Town Hall at Ossett, in Yorkshire. The site on which it is proposed to build the hall covers an area of about 3,620 yds. The plans for the building have been prepared by Messrs. Holtom & Fox, architects, of Dewsbury, who estimate the cost of erecting and furnishing it at 11,000*l*. Fronting to Bank-street, the Town Hall will have the elevations in the Classic style, with square and circular headed windows; the front and return elevations to be in ashlar, and the remainder in pitch faced delph stone. At the front there will be a rustic basement with columns and pediment over, with extensions on either side for staircases. The ground floor (above the basement) will be elevated some four or five feet above the ground level, and will comprise the Municipal offices, Borough court, and a Council chamber. Above will be a large assembly hall, with a gallery and balcony. The principal entrance to the Municipal offices will be in Bank-street, approached by a short flight of steps. On the right side are to be the Town Clerk's private office, general office, strong-room, rates-office, Mayor's room, and Council chamber; on the left the Surveyor's room, Borough court, magistrate's retiring-room, waiting-room, and committee-room. The whole of these rooms are to be 13 ft. high, with the exception of the Council chamber and court, which will be 16 ft. The entrances to the large assembly hall are to be in the wings on either side of the main building. The hall will be 100 ft. long and 54 ft. wide, and there will be seating accommodation in the area for 860 persons; whilst in the balcony and gallery there is to be accommodation for another 300. The platform will be large enough to accommodate a band and chorus of 150. Anterooms for performers are also to be provided. In the basement will be offices for the water inspector and the weights and measures inspector; also three other offices or store-rooms, a prisoners' waiting-room and police-room, as well as kitchen, heating chamber, and coal cellars.

SANITARY AND ENGINEERING NEWS.

Annfield Plain Railway Extension, Durham.—On the 17th inst. the new West Durham Railway from Annfield Plain to Blackhill was opened for public traffic. The route of the railway is that of an old line, long used for minerals, and now altered and adapted also for passengers. The line just opened is part of a section of the North-Eastern Railway that extends from between Birtley and Chester-le-Street to Blackhill. The first portion, that from the Birtley Junction to Annfield Plain, was completed by Messrs. Whittaker Bros., of Leeds, and opened in the early part of 1894. A little later in the same year steps were taken towards the completion of the link needed to connect the line with the Consett branch; and in August, 1894, the contractors, Messrs. J. D. Nowell & Sons, of London, commenced with the work which has now been brought into use. The length of the new line is about six miles. The work of conversion from the Consett junction was effected by Mr. T. D. Ridley, of Middlesbrough. The works entailed have been heavy and expensive, including a number of bridges; the intention of the engineers has been to make the new railway one with double lines, and in every way fitted for the service of a populous mineral district. The cuttings and embankments are not very heavy, but there are some heavy gradients. Mr. C. A. Harrison, Engineer to the N.E. Railway, designed the works. The station at Leadgate is of wood, with waiting rooms, &c., on each side of the double lines. The platforms are constructed principally of timber. The Consett station is situated in New Station Road. The platform is constructed on the Island principle, of cement. The station building, which is of wood, with a verandah running its full length at each side, has, in addition to the usual booking office and offices for the officials, a large general waiting room, first and third-class waiting rooms for ladies and gentlemen, and the usual conveniences. The lines run almost continuously on a curve from Consett to Blackhill, they cross bridges that are built over the Darlington and other lines, make a gradual descent, and then the train takes to the main line as the lower end of the Consett Ironworks is approached. The run is straight and level then into Blackhill station.

Bridge, Bridge Sollars.—The new bridge spanning the River Wye at Bridge Sollars, about six miles above Hereford, was dedicated to the use of the general public recently. The bridge is of iron, resting at either end on stone abutments, and supported in the middle by two pairs of cylindrical columns, the lattice girders and superstructure thus forming three spans. The distance between the abutments is 188 ft., the spans between the cylinders and abutments 61 ft., and the central span 64 ft. The iron columns are 4 ft. 6 in. in diameter. These are topped with ornamental stone caps, and the whole is surmounted by the superstructure in the shape of the roadway and the lattice work sides, the latter being 4 ft. 6 in. deep. The width of the roadway is 15 ft. Each pair of columns is tied with braces. The stone for the abutments came from the Foxley estate, out of the Darkhill quarry, and the cap-stones, copings, and string courses are Forest of Dean stone. The joint engineers engaged were Mr. Stephen Williams, County Surveyor for Radnorshire; and Mr. R. L. Bamford, of Hereford, the latter being the resident engineer, superintending the work. The contractors were—Mr. John Preece, of Marden, for the approaches, the abutments, and fixing the cylinders; and the Horsehay Company, Shropshire, for the superstructure, Mr. Salt being the foreman of earthwork and masonry, and Mr. Hancocks, foreman erector.

Public Improvements, King's Norton Rural District.—Colonel A. G. Durnford, one of the inspectors of the Local Government Board, recently conducted an inquiry at the Workhouse, Selly Oak, relative to an application made by the King's Norton District Council for sanction to borrow 4,500*l*. for works of street and bridge improvements. The Council was represented by Mr. Edwin Docker (clerk), Mr. R. J. Curtis (assistant clerk), Mr. R. Godfrey (surveyor), and Mr. J. Webb (assistant surveyor). The application was that the loan might be made repayable in thirty years, and the following are the details of the projected works and the estimated cost:—Extension and widening of Bournville-lane, 548*l*. 17s. 10d.; extension and widening of Silver-street, King's Heath, 353*l*. 19s. 1d.; widening of Avenue-road, King's Heath, 634*l*. 6s. 3d.; widening of Quarry-lane, Northfield, 300*l*.; rebuilding of California Bridge, Northfield, 102*l*. 8s.; widening canal and railway bridges in Raddle Barnlane and Workhouse (exclusive of 1,100*l*. contributed by the Birmingham Corporation), 2,178*l*. 16s.; tarpaving of footpaths, 302*l*. Mr. Docker explained that the improvements were rendered necessary by the rapid growth of the district, and particularly by the opening up of building estates.

Sewage Scheme, Poynton, Cheshire.—A Local Government Board inquiry was recently held at the News-room, Poynton, before Mr. W. O. E. Meade-King, M.Inst.C.E., Inspector to the Local Government Board, into the application of the Macclesfield Rural District Council to the Local Government Board for sanction to borrow 5,800*l*. for works of sewerage and sewage disposal for the township of Poynton-with-Worth. The Surveyor (Mr. Thorpe) it was stated, had submitted two schemes in April, 1895, which were substantially the same, but with different disposal sites. With a view to obtaining the best advice in the matter, the District Council engaged Mr. Fowler, of Westminster and Manchester, to investigate and report. Mr. Fowler recommended two other alternative sites lower down the stream—one within, the other without the district; the one without the district being the most suitable. The Surveyor was then directed to amend his scheme so as to incorporate Mr. Fowler's recommendations. In December last the amended scheme was adopted. The owner of the proposed site without the district refused to negotiate for the sale of any of his land. The scheme now being inquired into was the one with Mr. Fowler's alternative site. The statement of the scheme read by Mr. James Thorpe (Surveyor and Inspector) stated that the site for the disposal works covered 4½ acres, 3½ being available for irrigation. The sewage, after being screened, would be conveyed by underground

carriers to nine distributing chambers 104 ft. apart, from each of which chambers the sewage could be turned on to the land. There were no manufacturers' wastes, and the road washing would be excluded, and all other surface waters as far as practicable, existing sewers and water courses being available for these. The scheme made some provision for precipitation and filtration, but they did not desire to have to carry out this portion of the scheme until they found there was necessity for it. In setting the size and gradients of the sewers, it had been estimated that they might have to serve a population of 2,500 in thirty years hence.

FOREIGN.

FRANCE.—The large group of hot-houses for the city of Paris, which are being constructed at Boulogne-sur-Seine, from the plans of M. Formigé, will be finished next year. The principal building will be decorated with sculptures, and a fountain designed by M. Dalou will be placed in a central position among the plants.——M. Puech, the sculptor, has just completed the model for the alto-relief for the Salon Diplomatique at the Paris Hôtel de Ville. This relief, which will be four mètres in height, shows a figure symbolising the city of Paris, dominated by an allegorical group of figures representing "Thought," "Science," and "Labour"; the whole relieved against a background representing the Ile de la Cité. It is a matter of discussion whether the work should not be carried out in bronze instead of in marble as at first intended. ——The new building for the Opéra Comique, an illustration of which was published in the *Builder* of August 26, 1893, is now sufficiently advanced for some idea to be formed of its effect when complete. It is hoped that the building will be roofed in by the end of the year, and the architect, M. Bernier, will then take in hand the interior fitting of the house.——M. Puech has completed the model of the monumen to the poet Leconte de Lisle which is to be erected in the Luxembourg garden. The monument, the architectural portion of which has been designed by M. Scellier de Gisors, will comprise a bust of the poet and a marble figure representing the Muse holding in her hand a palm in gilt bronze.——M. Chaplain has been commissioned to design a medal in commemoration of the visit of the Czar to Paris, which will be struck at the Mint ("La Monnaie") in the presence of the Russian Sovereign.——MM. Baubain (architect) and Guimberteau (sculptor) have just completed the model for the monument to President Carnot to be erected at Annecy. It is to be in Italian marble, and consists of a portrait statue of Carnot behind which is a veiled figure representing France, leaning on a shield bearing the arms of the town of Annecy. Another monument to Carnot has just been inaugurated at Châlons-sur-Marne, the work of two talented sculptors, MM. Massoule and Dagonet. As in nearly all the other monuments, a figure representing France holds a palm towards the bust of Carnot; in this case another point is added in the shape of an allegorical figure holding up the national flag of France above the bust.——The exhibition at Montpellier has been completely destroyed by fire; the damage is estimated at three million francs. Pictures, objects of art of great value, as well as ancient documents, have been destroyed in this unfortunate conflagration, which originated in a panorama theatre.——It is announced that a new bridge is to be built over the Rance at St. Servan, opposite Saint-Malo.——The death is announced, at the age of 45, of a sculptor of talent, M. Jean Mombur. At the Champs Elysées Salon, where he this year exhibited two busts, he had received medals in the years 1882, 1883, 1884 and 1892. He obtained a bronze medal in the Paris exhibition of 1889, and a travelling scholarship in 1895. The Municipality of Paris possesses two of his works, "Paysanne d'Auvergne" and "Un Sauveteur," and the State had given him a commission last year for a group to be entitled "Le Baiser Filial."

UNITED STATES.—The awards have been made in the architectural competition for the design of the capitol for the State of Montana, to be erected at Helena at an estimated cost of 1,000 000 dols. Mr. George R. Mann, of St. Louis, won the first premium of 5,000 dols.; Cass Gilbert, St. Paul, second, 1,500 dols.; Strange & Strent, Los Angeles, third, 1,000 dols.; P. J. Lauritzen, New York City, fourth, 500 dols. Fifty-nine plans were in the competition.——The Department of Public Works in New York City is experimenting with a new manhole cover designed to lessen the noise occasioned by heavy teams striking the present cast-iron covers. The new manhole cover as laid in Fifty-eighth-street, where it has given apparently favourable results, is a disc of asphaltic composition set in an iron frame. Only the outer rim of the iron frame is exposed to traffic, and the sound of wheels striking this is deadened by the asphaltic composition in the centre.——The Civil and Sanitary Engineering Societies of Illinois, through their representatives, decided at a meeting held in Chicago, August 5, to advocate before the Legislature such changes in the laws as shall place under the control of the State Board of Health all the water supplies in Illinois, the disposal of sewage, and the sanitary arrangement of all public buildings. The movement is the outcome of a resolution passed at the annual convention of the Illinois State Society of Engineers and Surveyors at Galesburg, January 29. Besides this Society there were represented the State Board of Health, the State Medical Board, the Western Society of Engineers, and the State University, and it is proposed to invite the State Homœopathic Society and the State Eclectic Board to aid in advocacy of the measure. In the conference the appointment of a sanitary engineer at a salary of not less than 5 000 dols. a year was favoured.—*Engineering Record.*

MISCELLANEOUS.

DISCOVERY IN A NORFOLK CHURCH.—A discovery was made in All Saints Church, Gresham, a few days ago, by the rector. While chiselling away some of the plastering on the south wall of the sanctuary, he came upon a portion of bevelled stone, which eventually proved to be an old piscina, in excellent condition, built in with bricks and flint. —*Norfolk Chronicle.*

THE MAIN ROADS IN THE NEW FOREST.—At the last meeting of the New Forest Board of Guardians, Mr. Roy said that for the information of the Council he might state that the increased expenditure asked for for the main roads had been allowed. The Surveyor had reported that he was not satisfied with the state of the main roads last year, but he should not withhold his certificate because the District Council had taken in hand an amended system of dealing with the roads, and which he wished should have a fair trial. The Clerk read a letter from Mr. Courtenay F. Wilson, C.C., enclosing a petition he had received, and asking that it might be laid before the Council. It was as follows:—(1) The roads under the authority of the New Forest District Council and their predecessors have for several years seriously and rapidly deteriorated, and are now unfit for the traffic which passes over them, and in many places are in a dangerous condition. (2) In the winter many of these roads become foundrous, and in some cases almost impassable. In summer their surfaces break up and crumble into loose stones and dust. (3) By reason of the condition of the roads there is danger that the County Council may withhold or impose onerous conditions upon the contributions made by them to you, the New Forest Council as the Highway Authority, to the great loss of your memorialists. (4) A complete change is urgently required either in the material used or the system pursued in the maintenance of the roads under your authority, or in both of these particulars.—Mr. Andrews said the memorialists were three months late, as the District Council had taken the matter into consideration, and decided on a new system for dealing with the roads.

FALL OF A STATION ROOF AT NOTTINGHAM.—An accident occurred recently at the Midland Station, Nottingham, resulting in injuries to several persons. An engine used in shunting operations fouled the points, and came into violent contact with one of the iron columns supporting the roof covering the passenger platform. Masses of glass, iron, and woodwork fell, the roof being broken open to an extent of nearly 60 ft.

WINDOW, FREE CHURCH, PRESTONPANS.—A two-light ornamental foliated window, with medallion centres, has been inserted in the Free Church, Prestonpans. The window was executed at the studios of Messrs. Ballantine & Gardiner, Edinburgh.

SANITARY INSTITUTE HEALTH EXHIBITION, NEWCASTLE.—A meeting took place at Olympia, Newcastle, recently, of delegates from the Durham College of Science (technical branch), Newcastle Operatives' Association, the Master Plumbers' Association, and students. Mr. Brown explained the object of the deputation, which was to lay before the exhibition authority a scheme for illustrating, in a practical way, the work and teaching methods of the technical education branch of the Durham College of Science. It was proposed that the illustrations should be of a very practical kind, and should be confined to students. The curator of the exhibition said that the Sanitary Institute would place a central large space at the disposal of the deputation, and would facilitate the display, which should be of great educational value, and most interesting to the general public. A committee of five was elected to arrange details, including representatives of each of the sections present.

WOOD PAVING IN LONDON.—The use of hard wood for the surface of roads in London, especially where the traffic is heaviest, has in the last few years rapidly increased. Vestry surveyors in St. Pancras, Lambeth, Hammersmith, St. Martin's-in-the-Fields, and other metropolitan parishes have expressed a decided preference for the hard over soft wood as road-making material, "not only for sanitary reasons, but on the grounds of efficiency, economy, and saving of constant renewals." In this view, a special committee of the Paddington Vestry appointed to consider the whole subject of wood-paving—whose report has just been issued—entirely concur. The committee in their report state that if the life of hard wood as against that of soft wood be estimated by its wear, they consider that at least fifteen years may be taken for hard wood against a life of six years for soft wood on roads subject to heavy traffic, and they strongly recommend their Vestry to follow the example of other London parishes, and in future discontinue the use of soft wood for paving purposes. They are confident that not only will a considerable saving be thus effected, but the roads will be far better and more sanitary than at present. As an evidence of the life of hard wood, the Committee direct attention to that laid on the south side of Westminster Bridge. In spite of the enormous traffic it has had to bear, the paving has stood for seven years, and is now in fairly good condition. There are now eight miles of wood paving in Paddington.—*Citizen.*

RESIGNATION OF THE KING'S NORTON SURVEYOR.—A meeting of the King's Norton Rural District Council was held at the Selly Oak Workhouse on the 19th inst., Mr. J. W. B. Brown presided, and announced that he had received a letter from Mr. R. Godfrey, the Surveyor to the Board, in which he desired to tender his resignation. The chairman moved: "That the resignation of Mr. Robert Godfrey, as Surveyor, be and the same is hereby accepted, to take effect from to-day." Mr. E. Holmes seconded the motion, which was carried. The Chairman then submitted that the appointment of a successor to Mr. Godfrey be referred to a committee of the whole Council, and also all questions arising out of the resignation. The proposition was seconded and carried.

CAPITAL AND LABOUR.

LEEDS BUILDING TRADE STRIKE.—Two of the strike hands connected with the Leeds building trade were recently fined 40s. and costs each, with the alternative of one month's imprisonment, for assaulting a non-unionist who, as he was going to his work, was seized by four men and struck in the face. In passing the sentence, the Bench said this was a free country, and a working man had a right to sell his labour as best he could. The freedom of every workman must be protected, and any future offences would be met by imprisonment.

THE BRICKLAYERS' STRIKE, COVENTRY.—Though the strike referred to last week was practically confined to outside bricklayers, the Coventry Operative Society have decided to apply for an increase as soon as they are entitled to. According to the rules, applications of this character can only be heard on January 1 of each year, increases, supposing they are granted, to take effect the following April. The workmen will make a demand for an extra 1d. per hour, bringing their wages up to 9d.

THE BUILDING STRIKE, DUBLIN.—A conference between the representatives of the Dublin Master Builders and of the Bricklayers' Society has just been held in the Archbishop's House, Drumcondra, when the Archbishop presided. After discussion a settlement of the points at issue was come to with the bricklayers, and it was agreed to resume work. The result of the new rules that have been adopted is to give the men an increase of ½d. per hour, but to reduce their working hours per week from 57 to 54, thus making the time worked the same as that of the carpenters, as was suggested by the masters. Some matters of detail it was agreed should be dealt with in due course under the terms of Rule 11. The rules about apprentices have been made more satisfactory than they formerly were, the graduated scale of wages suggested by the masters having been adopted, but the rate of wages for each year proposed by the masters has been somewhat increased. Rule 11 is a most important one, as it provides for the friendly settlement of any dispute, not involving a change in the rules, that may hereafter arise. Such disputes are to be settled by three representatives from each side, who will have power to select an umpire if necessary. The decisions of this tribunal are to be binding on both parties. Rule 12, which formerly provided that three months' notice was to be given of any change with regard to hours or wages, has been altered so that notice must be given of all contemplated changes, even if they do not touch the question of hours or wages. To make the rule work more smoothly than it has hitherto done, provision is made that in future when one side gives notice to the other a reply must be sent within one month from the date of service of the notice. This will give two months for conciliation and adjustment, and this is regarded as a very important matter.

LEGAL.

ALLEGED DAMAGE TO PREMISES THROUGH SUBSIDENCE:

CASE IN THE VACATION COURT.

THE case of Hey *v.* Hill came before Mr. Justice Chitty, sitting as Vacation Judge, on Wednesday, it being a motion to restrain the defendant from excavating or digging up soil, &c., in a road so as to damage the plaintiff's premises.

Mr. Alexander, Q.C., appeared as counsel for the plaintiff, and Mr. Chubb for the defendant.

His Lordship ultimately made an order directing that the motion should stand over till the second motion day next sittings, the defendant giving an undertaking in the terms of the notice of motion

CONTRACTS AND PUBLIC APPOINTMENTS.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Twenty-two Houses, Ruthella-street, Carlisle	.....	A. W. Johnston, Archt. 27A, English-st. Carlisle	Sept. 1
House, Walton, Aylesbury	.....	W. F. Taylor, Archt. 26, Temple-street	do.
Residence, St. John's Walk, Bridlington, Yorks	.....	J. Earnshaw, Archt. Carlton House, Bridlington Quay	do.
Chapel and School, Goole	United Methodist Free Church	H. B. Thorp, Archt. Goole	do.
Fifteen Houses, Trythogga, Gulval, Cornwall	W. Thomas	N. C. Whear, Archt. Holbein House, Penzance	do.
Infirmary and Workhouse	Ipswich Union	S. Salter & Co., Archt. 28, Woburn-place, W.C.	do.
*Water Drainage	Aldershot U.D.C.	Banks Rusford, Council Offices	do.
*Road Making	do.	do.	do.
*Lifting Pump	Stroud Union	F. Winterbotham, Union Offices, Stroud	do.
Drainage Works, St. Burns	Chester-le-Street R.D.C	H. Webb, Surv. 15, Lumley-terrace	Sept. 2
Road Works, Sheridan-terrace, Hove Shops and Warehouse, &c. Denaby, Yorks	.....	Town Surv. Town Hall	do.
Dwelling-houses, Cleveland-road, Edgerton	.....	H. H. Wray, Denaby	do.
Re-building, &c. Crosschapling, Coventry	.....	J. Berry, Archt. 9, Queen-street, Huddersfield	do.
Enlarging Fern Hill, Clonakility, Ireland	Matterson & Co. Lim.	B. W. Chattaway, Archt. Trinity-churchyard	do.
Additions, &c. to Police Stations, Tarland, Aberdeen	H. T. Wright	W. H. Hill, Archt. 28, South Mall, Cork	do.
Waterworks	.....	W. Henderson & Son, Archt. 124, Union-st. Aberdeen	Sept. 3
Additions to Baths, Derby-street	East Westmoreland R.D.C.	G. Watson & Son, Engr, Penrith	do.
Factory, &c. St. Andrew's Dock, Hull	Leek U.D.C.	Town Surv. Town Hall	do.
Street Works, Hebden Bridge	Hull Fish & Oil Co. Lim.	A. Simpson, C.E. Doddington-chambers, Hull	Sept. 4
Villas, Mayroyd Estate, Hebden Bridge, Yorks	.....	G. Buckley & Son, Surv. Tower-chambers, Halifax	do.
Additions to Electric Lighting Station, Temple Back	Bristol Corporation	do.	do.
Boilers, Radiators, and Heating Apparatus	Sussex County Hospital	H. Williams, Archt. 24, Clare-street, Bristol	do.
Police Station, Clydach, Swansea Valley	Glamorganshire C.C.	F. T. Cawthorn, 33, New-road, Brighton	Sept. 5
Warehouse, Raglan-street, Halifax	.....	T. M. Franklin, Clerk, County Offices, Cardiff	do.
Granite, &c.	Hoole (Cheshire) U.D.C.	C. F. Horsfall & Son, Archts. Lord-st.-chambrs, Halifax	do.
Sewers, South Bank, Middlesbrough	Normanby U.D.C.	C. A. Ewing, Surv. 22, St. Werburgh's-st. Chester	do.
Waterworks	Ashby-de-la-Zouch U.D.C.	H. T. Hopper, C.E. Town Hall	do.
Granite Road Metal	Brigg U.D.C.	G. & F. W. Hodson, C.E. Loughborough	do.
Sewers, &c.	Bromsgrove R.D.C.	G. S. Bowter, Clerk, Council Offices	do.
Town Hall, Police Court, &c. Bank-street	Osset (Yorks.) Corp.	W. Fiddian, Engr. Town Hall, Stourbridge	Sept. 7
Alterations to Laundry, Leadgate Hospital, Durham	.....	Bolton & Fox, Archt. Dewsbury	do.
*Guernsey, &c. Granite, Steam Belling, &c.	Romford U.D.C.	T. W. Rounthwaite, Archt. 13, Mosley-st. Newcastle-on-Tyne	do.
* Iron Tank	Dunmow Union, Essex	G. Bailey, South-street, Romford	do.
*Caretaker's Cottage	Wimbledon U.D.C.	Workhouse, Gt. Dunmow	do.
*Making, Paving, and Lighting Road	Kingston-on-Thames Corporation	Council Offices, Broadway, Wimbledon, S.W.	Sept. 8
Cottages, Tolverne Barton, Cornwall	.....	Borough Surveyor	Sept. 9
		G. Gew, Tregothnan Office, Truro	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
*Granite Spalls and Broken Granite	Hackney Vestry	J. Lovegrove, Vestry Hall	Sept. 9
Granite road, Metal, &c.	Brumby & Frodingham U.D.C.	G. S. Bowter, Clerk, Brigg	Sept. 10
Schools, Kirton Skeldyke	Kirton Sch. Bd.	J. Sawyer, Archt. 62, Chancery-lane, W.C.	Sept. 12
Kerbing, &c.	Arnold (Notts.) U.D.C.	W. H. Higginbottom, King John's Chambers, Nottingham	do.
Water Works	Cheshunt U.D.C.	S. Towlson, C.E. Turner's Hill, Cheshunt	Sept. 14
Sewer	do.	do.	do.
*Erection of Brewery	Bath Brewery Co. Lim.	G. Adlam & Son, Engr. Bristol	do.
*Additions to Asylum	Wilts County Asylum	The Asylum, Devizes	Sept. 15
*Cleaning-out Waddon Pond	Borough of Croydon	Boro' Engineer's Offices, Croydon	do.
*Wood Paving	do.	Borough Road Surveyor, Town Hall	do.
*Granite Kerbing, Kentish Ragstone, Oil, and Disinfectants	Bexley U.D.C.	E. Reeve Boulter, Bexley Heath	Sept. 16
*Twenty 8-cp and 4 Two-ton Vans	County Borough of West Ham	L. Angell, Town Hall, Stratford, E.	do.
*Enlargement of Post Office	Com. of H.M. Works	M. Tanner, 15, Whitehall-place, S.W.	Sept. 18
*Foundations and Building Baths	Hull Corp.	Borough Engineer	Sept. 25
Mortuary, Durham County Hospital	Rev. V. K. Cooper	C. H. Fowler, Archt. The College, Durham	Sept. 29
*Railway Work, Goods Station Warehouse	G. N. R. Co.	W. B. Myers Beswick, 31, Park-square, Leeds	Oct. 1
*Pulling Down and Erection of Infirmary	Bethnal Green Guar.	Giles, Gough, & Trollope, 28, Craven-st. Strand, W.C.	Oct. 6
*Boring Well	Mellin's Food, Ld.	Works, Peckham, S.E.	no date
*Sewerage and Sewage Disposal	Malden & Coombe, U.D.C.	C. T. Lewis, Solicitor, New Malden, Surrey	do.
Additions to Works, Lockhurst-lane, Foleshill	Foleshill Cycle Co. Ld.	T. F. Tickner, Archt. 7, Bishop-st. Coventry	do.
Manufactory, Oakeywell-st. Dudley	J. H. Halliwell	J. G. Wright & Son, Archt. Wolverhampton-street, Dudley	do.
Barracks, Darwen, Lancs.	.....	M'Call & Robinson, Archt. 9, Tacketts-st. Blackburn	do.
Fourteen Cottages, Ardsley, near Barnsley	.....	J. P. Kay, Archt. 34, Prudential-bldgs. Leeds	do.
Church Schools, Gildersome, Yorks	.....	J. P. Kay, Archt 34, Prudential-bldgs. Leeds	do.
Laundry, &c. Grove-rd.	Harrogate Sch. Bd.	T. E. Marshall, Archt. Princes-st.	do.
Additions to Schools, Hemington, Derby	Lockington (U.D.) Sch. Bd.	A. Eaton, Archt. 6, St. James'-st. Derby	do.
Additions to Schools	Northampton Sch. Bd.	W. Hull, Archt. 12, St. Giles'-st.	do.
Eleven Houses, Stanningley Grange, Bramley	.....	Mr. Harrison, 11, Alan-st. Leeds	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*City Surveyor	Carlisle Corp.	420*l.* increasing to 500*l.*, offices, Staff	Aug. 31
*Clerk of Works	Aldershot U.D.C.	2*l.* 2*s.* per week	Sept. 1
*Building Construction, Teacher of	Kent & Surrey C.C.'s.	100*l.* per annum, with board and lodging	Sept. 3
*Borough Surveyor	Worthing T.C.	300*l.* rising to 350*l.*	Sept. 9
*Cemetery Superintendent	Commrs. of Sewers	200*l.* per annum, house, rates, taxes, &c.	Sept. 15

Those marked with an asterisk (*) are advertised in this Number. *Contracts*, pp. iv., vi., & viii. *Public Appointments*, pp. xvi. & xix.

without prejudice to any question which might arise thereon in the meantime.

ALLEGED INTERFERENCE WITH FOUNDATIONS OF PREMISES:

CASE IN THE VACATION COURT.

THE case of the Hull Brewery Co., Limited, *v.* The Liverpool, Leeds, and Hull Empire Palaces, Limited, was in the list for hearing before Mr. Justice Chitty, sitting as Vacation Judge last Wednesday, the 26th inst., it being a motion to restrain an alleged interference with the foundations of the plaintiffs' premises. Upon the case being called on, Mr. Fisher, Q.C., on behalf of the plaintiffs, said that he held an *interim* injunction, which had been granted on the 15th inst., and since then endeavours had been made to settle the matter, but the parties could not act without the sanction of the directors. Subject to his Lordship's sanction, the learned counsel asked that the matter might be allowed to stand over for a fortnight, the injunction to be continued in the meantime.

His Lordship: Good. I make that order.

DEFECTIVE MORTAR.

CHARLES EDWARD WOODHEAD, of 12, Hampden-road, Hornsey, was summoned on the 21st inst. by the Wood-green District Council, before the Wood-green justices, for a breach of the by-laws in the erection of certain houses in Palace-gates-road, by using mortar which was not compounded as required, on July 16. A second summons charged the defendant with continuing the offence for fourteen days after a written notice had been given him. The case had been adjourned in order that the defendant might be legally represented, and Mr. Avery now appeared for him.

Mr. Gunyon, Surveyor to the District Council, said that the burnt ballast found in the samples of mortar taken was compounded of imperfectly burnt ballast, and contained vegetable matter in the shape of roots and weeds which could be seen by the naked eye.

Robert Henry Harland, an analytical chemist, said that he had received samples, including five taken in August. Witness had mixed these samples, and analysed them. There was vegetable matter, which was apparent to the naked eye. There was a deficiency of lime. Under the bylaw there should be 13.4 per cent. of lime, but the analysis showed only 8.15 per cent. Properly burnt ballast would not yield the results which witness's examination gave.

Mr. Avery opened the case for the defendant, and called John William Stevens, architect, who said that he had taken samples on the 11th inst., and he considered that the mortar was of fair quality. It would be absolutely impossible to get mortar free from earthy matter where it was compounded on the ground as in this instance. The mortar used complied with the requirements of the bylaw.

Mr. Taylor, public analyst, said that samples taken by the previous witness were submitted to him. Witness found the proportion of lime to sand and grit was one to four, and to all other matter as one to five. The sample complied fairly with the standard required by the by-law.—The Bench was satisfied that the by-laws had not been complied with, and that there must be a conviction. They imposed a fine of 40*s.* in each case, with costs.—*Morning Advertiser.*

COMPLETION OF BUILDING CONTRACTS.

AT the Whitchurch County Court, on the 4th inst., before his Honour Judge Yate-Lee, an action was brought by George Dodd, builder, of Whitchurch, against John Weaver Chinton, solicitor, of the same town, for the sum of 26*l.* 10*s.* balance of account due on a contract for work done by plaintiff for defendant. With the exception of 10*s.*, the claim was not disputed, but the defendant put in a counter-claim of 50*l.*—twenty-five weeks at 2*l.* per week—for alleged breach of contract in respect to the time in which the work was to be completed. His Honour, who had reserved his decision, in giving judgment on the 19th inst., remarked that Mr. Chinton had submitted that the penalty of 2*l.* per week for delay in completion was to be taken as liquidated damages, and that was not disputed by plaintiff's counsel. But some extras were ordered beyond the work expressly mentioned in the specification. Mr. Dodd had stated in his evidence that he could not have completed the work, with the extras, within the stipulated time. Mr. Chinton had claimed the 2*l.* per week for which the work was delayed after deducting two weeks, which he maintained was a fair time for doing the extras. Upon the question whether the order for extras prevented a claim for liquidated damages under a contract in the particular form which the parties had entered into, each side relied on the views of certain writers, but no decisions were produced, although the names of several, cited in the text books, were given. He had, however, examined the leading cases on the subject, and, in his opinion, they established that under a building contract, with conditions framed as in the present case, the builder was relieved from his obligation to perform by a stated time when the employer ordered extras. The damages here were not the actual damages suffered, but an artificial sum agreed upon before-hand by the parties for a particular event, and when the event was altered by even a slight amount of extra work, the damages were not liquidated for the new event, and were not necessarily the 2*l.* per week with allowance of time for doing the extras. To him, no question as to a cross action being necessary arose, and therefore it must be dismissed. Plaintiff was represented by Mr. A. E. Whittingham, of Nantwich, and defendant by Mr. W. H. Churton, of Chester.—*Liverpool Mercury.*

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

13,679.—MORTISE CHISEL FOR PULLEY STILES: *R. Smith and another.*—A double cut mortise chisel for cutting pulley stiles, by which the mortise for pulley and the bearing for the flange of same can be cut at one operation, thereby saving time. The tool has two sharp-edged cutters, one the width of the mortise and the other the width of the flange of the pulley; one end made to fit machine, the other in form like two wood chisels. The cutters are the same width apart as the end flange of the pulley. The novelty claimed is that this tool will cut three or more mortises by simply changing the front cutter.

13,973.—PIGMENTS AND PAINTS: *S. B. Schryen.*—Concerns the formation of a paint consisting essentially of a mixture of tersulphide of arsenic and sulphur precipitated by the addition of an acid, preferably hydrochloric acid, to a mixture of a solution of sulphur in lime and a dilute solution of white arsenic in an alkali. This class of paint can be precipitated with other pigments such as prussian blue, &c.

17,137.—SAWING MACHINES: *C. E. Turnock.*—In existing saw-benches it is only possible to obtain one cut at a time, and the timber has to be drawn back and again presented to the saw. The inventor expedites sawing by providing a series of saws each mounted on an independent spindle, one behind the other, the spindles being incapable of sliding transversely. He also makes benches in sections, each containing two circular saws, and adopts fence-plates, brackets, and plates in combination with the saws according to the arrangement of his invention.

17,191.—DEVICE FOR SUPPORTING PLANKS ON STAGING: *W. Davison.*—The device consists of an iron bar bifurcated at one end, and the two arms thus formed bent into hooks. The other end of the bar is provided with a chain, cord, &c. Planks may be supported by two ladders by passing hooked end over one rung of each, while the free end of chain is attached to another rung higher up, having been firmly supported at right angles to wall.

17,304.—VENTILATORS: *E. H. Shorland.*—To render movable doors on covers of ventilating conduits adjustable by means of screws. These are specially adapted to be operated by a removable key, so that only the possessor thereof can interfere with the regulation of the said doors. Various methods of so doing are covered by the specification.

17,559.—SASH WINDOWS: *J. Preston.*—Refers to improved fittings for sliding sash windows, to enable them to be swivelled into rooms, and consists in the adoption of swivelled-kneed arms to engage on eye-plates, and also embraces device for securing the counter-balance cords.

NEW APPLICATIONS FOR LETTERS PATENT.

AUGUST 10.—17,627, W. Millar and O. Jones, Composition and Manufacture of Artificial Stone and Slate.—17,636, G. Hutchinson and others, Composition for use as Paving.—17,639, J. Gibson, Jun., Flushing Apparatus for Water-closets.

AUGUST 11.—17,707, A. Roxburgh, Sewer Ventilator and Sewer Gas Destructor.—17,716, J. Hunter, Facilitating the Raising and Lowering of Door Curtains to Prevent Draughts.—17,739, F. Furness, Interlocking Tiles.—17,748, G. Platner and A. Müller, Tops or Cowls for Chimneys, Ventilators, &c.—17,749, E. Podmore, Securing Sheets of Zinc, &c., for Roofing Purposes.—17,763, P. O'Dowd, Disinfecting Sewer Gas in Water-closets.—17,820, E. Sutton and J. Hagan, Door Locks.

AUGUST 12.—17,830, J. Foster, Kilns for Burning Lime, Stone, Cement, &c.—17,849, W. Callaghan, Paint Brushes.—17,857, J. Kennedy, Apparatus for the Cleaning and Painting of Windows Outside, and also Applicable as a Fire Escape.—17,863, G. Cougill, Door Opening Devices.

AUGUST 13.—17,949, W. Wynne, Securing Door Handles.

AUGUST 14.—18,003, W. Hill, Combined Road Kerb, Channel, and Breast Block.—18,026, F. David, Fireproof Partitioning for Buildings.

AUGUST 15.—18,086, S. and J. Dibble, Combined Water-closet and Sink.—18,102, H. and J. Dean, Surface Indicator to Indicate the Position and Direction of Drain and other Pipes.—18,122, W. R. and L. Auty, Flushing Apparatus for Cisterns, Tanks, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

13,022, J. Cummins, Screw Nail.—13,719, G. Langley Chimney and Ventilating Shafts.—13,737, A. Nicholl, Bricks.—15,565, W. Penny, Window Sashes.—16,310, W. Millar, Utilisation of a Waste Product in the Production of Wall, Ceiling, or other Plaster.—16,857, J. Danby, Non-conducting and Protective Composition, Specially Adapted for Covering the Surfaces of Metallic Structures, but applicable also to other Structures, to Prevent Radiation of Heat.

COMPLETE SPECIFICATIONS ACCEPTED,

Open to opposition for two months.

18,438, T. Clark, Flushing Cisterns for Water-closets.—18,460, C. Credland, Painters' Burning-off Stoves.—18,909, W. Culver, Pipes for Hot-water Apparatus, &c.—19,167, W. Edgar, Windows.—19,290, T. Bailey, J. Lowe, and T. Fletcher, Novel or Improved Appliances for use in Supporting Vertically-sliding Window Sashes and Doors.—21,285, J. Burman, Fasteners for Windows, &c.—15,274, G. Thiemike, Bricks.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 10.—By RUTLEY, SON, & VINE.

Willesden.—5 and 6, Oak Cottages, u.t. 86 yrs., g.r. 6*l.*	£190
1 to 8 and 13 to 17, Oak-rd., u.t. 86 yrs., g.r. 40*l.* 8s.	1,255
1 to 5 and 10 to 20, Bridge-rd., u.t. 87 yrs., g.r. 40*l.*	1,990
1 to 4, Oak Cottages, u.t. 86 yrs., g.r. 12*l.*	370
Bridge-rd.—Two building plots, f.	430
Regent's Pk.—40 and 42, Longford-st., u.t. 25 yrs., g.r. 15*l.*, r. 73*l.*	640
148, Albany-st., u.t. 32½ yrs., g.r. 10*l.*, r. 70*l.*	465
102, William-st., u.t. 26 yrs., g.r. 8*l.*, r. 48*l.*	375
Camden Town.—24 and 25, Lyme-st., u.t. 43 yrs., g.r. nil, r. 90*l.*	1,035
Holloway.—47 and 49, Hampden-rd., u.t. 50½ yrs., g.r. 10*l.*	300

By CRUSO & WILKIN (at Feltwell).

Feltwell, Norfolk.—"The Cock Hotel," and 1 a. 1 r. 9 p., c.	970

By PHILIP DAVIES (at Presteigne).

Presteigne, Radnor.—Enclosures of land, 10 a. 0 r. 30 p., f.	1,080
Two houses and five cottages, f.	795
New Barn and Cold Harbour Farm, 42 a., f.	1,860
"Green End House," and enclosures, 2 a., f.	1,025
Stapleton, Hereford.—A cottage and enclosures, 17 a. 3 r. 11 p., f.	1,205
Willey, Hereford.—"Tipton Farm," 149 a., f.	1,550

By WYATT & SON (at Arundel).

Polling, Sussex.—Four freehold cottages	515

August 11.—By W. DEW & SON (at Pwllheli).

Llanbedrog, Carnarvon.—"Glyn-y-Weddw" Farm, 196 a. 3 r. 18 p., f.	7,000
"Crugan" Farm, 220 a. 2 r. 8 p., f.	11,500
"The Cottage," and 8 a. 2 r. 25 p., f.	1,250
"Bol-y-Mynydd" Farm, 33 a. 1 r. 24 p., f.	1,300
"The Glyn-y-Weddw Arms" Inn, f.	500
Numerous small holdings, containing 167 a. 3 r. 23 p., f.	7,906

By W. A. BLAKEMORE.

Mayfair.—41, Hill-street, u.t. 40¾ yrs., g.r. 333*l.*,	£1,050

By NORMAN & BOWEN.

Spitalfields.—2, Shepherd-st., 1, Tilley-st., and shop and sheds in Sawyer's-yd., f., r. 60*l.*	1,330

By P. & G. GEEN.

Islington.—19, Canonbury-grove, u.t. 22 yrs., g.r. 7*l.*, r. 43*l.*	220
278, Essex-rd., u.t. 21 yrs., g.r. nil, r. 42*l.*	210
Fulham.—33, 35, 37 and 39, Ancill, u.t. 68 yrs., g.r. 16*l.* 16s.	135
Holloway.—13, 15 and 17, Brand-st., u.t. 49 yrs. g.r. 14*l.*	

By N. W. ROBINSON (at Watford).

Bushey, Herts.—Enclosures of land, with buildings thereon, 5 a. 2 r. 25 p., f.	800
Finch-lane.—Enclosures, 16 a. 0 r. 35 p., f.	1,700

August 12.—By G. HEAD & CO.

Fulham.—648, 650, and 652, Fulham-rd., f., r. 165*l.*	2,975
2 and 4, Radipole-rd., f., r. 78*l.*	1,065

By E. H. HENRY.

Harrow, Middlesex.—Stanley-rd., 5 building plots, f.	130
Bayswater.—44, Northumberland-pl., u.t. 50 yrs., g.r. 6*l.*, r. 44*l.*	450

By W. H. HILTON.

Stamford Hill.—37, Franklin-st., u.t. 92 yrs., g.r. 5*l.*	185
Homerton.—37 and 38, Crozier-ter., u.t. 65½ yrs., g.r. 8*l.*	155

By HOBSON, RICHARDS, & CO.

Stoke Newington.—59, Osbaldeston-rd., u.t. 82 yrs., g.r. 8*l.* 8s., r. 45*l.*	475
Camberwell.—120, Poplar Walk-rd., u.t. 70 yrs., g.r. 4*l.* 10s.	230

By LOUND & HOWITT (at Masons' Hall Tavern).

Virginia Water, Berks.—"The Wheatsheaf Hotel," with lease and goodwill, u.t. 35¼ yrs., r. 114*l.*	10,250

By WYATT & SON (at Chichester).

Paghan, Sussex.—"Honor Farm," 94 a. 1 r. 29 p., f.	1,800
Enclosures of land, 11 a. 1 r. 11 p., f.	270
Mundham, Sussex.—A freehold cottage	130

By CHINNOCK, GALSWORTHY, & CO. (at Chipping Norton).

Salford, Oxon.—"The Cross Hands Inn," and 51 a. 1 r. 20 p., f.	2,000
Enclosures of land, 13 a. 1 r. 6 p., f.	600
Residence, 8 cottages, and enclosures, 2 a. 0 r. 14 p., f.	785

By W. DEW & SON (at Pwllheli).

Llaniestyn, Carnarvon.—"Nant Fawr" Farm, 46 a. 2 r. 32 p., f.	1,600
"Tynewydd-y-Parc" Farm, 15 a. 3 r. 16 p., f.	600
"Ty Bwlcyn" Farm, 29 a. 0 r. 27 p., f.	1,000
"Cors-y-Wrach" Farm, 10 a. 3 r. 31 p., f.	500
"Lon Fudr" Farm, 24 a. 2 r. 28 p., f.	850
Nevin, Carnarvon.—"Bryn Coch" Cottage, and 2 a. 2 r. 8 p., f.	440
Denio, Carnarvon.—"Graianog" Farm, 9 a. 1 r. 34 p., f.	720
Llanarmon, Carnarvon.—"Bryn Rhydd" Farm, 166 a. 2 r. 33 p., f.	4,260
Pwllheli, Carnarvon.—High-st., "The Crown Hotel" and smithy adjoining, f.	2,750
High-st., "The National Provincial Bank" and shop, f.	1,780
High-st., &c., a block of eight houses and shops, f.	2,638
Talcymmerau-rd., enclosures of land, 18 a. 2 r. 17 p., f.	1,865
Ceidio, Carnarvon.—"Plas-yn-Ngheidio" Farm, 182 a. 0 r. 32 p., f.	4,780

August 13.—By NOCK & JOSELAND (at Birmingham).

Birmingham.—84, Wenham st., f., r. 22*l.* 2s.	240

By J. A. EGGAR (at Farnham).

Farnham, Surrey.—"Dippinhall Farm," 69 a. 1 r. 4 p., c.	2,450

By RENDELL & SYMONS (at Newton Abbot).

Newton Abbot, Devon.—"Daracombe," and 30 a. 3 r. 23 p., f.	6,000

By NORTON, TRIST, & GILBERT.

Bredhurst, Kent.—"The Green Farm," 8 a. 3 r. 16 p., f.	1,110
Walthamstow.—29, Byron-rd., u.t. 64 yrs., g.r. 4*l.*, r. 18*l.*	100

By STIMSON & SONS.

Anerley.—38, Thicket-rd., f., e r. 70*l.*	550
3 and 5, Anerley Pk-rd., f., r. 130*l.*	1,020
City.—9, Water-lane, f., e.r. 258*l.*	2,200
Tower Hill.—4, Savage-gardens, f., r. 276*l.*	2,750
Lambeth.—45 and 47 Lambeth Walk, f., r. 60*l.*	510
Homerton.—5, Crozier-ter., u.t. 65½ yrs., g.r. 2*l.* 10s.	110

By WILLIAM WESTON.

Brondesbury.—2, Garlinge-rd., u.t. 83 yrs., g.r. 8*l.*, e.r. 65*l.*	475

By BEADEL, WOOD, & CO.

Castle Hedingham, Essex.—Enclosures of land, 3 a. 1 r. 24 p., f.	301
Sible Hedingham, Essex.—Land tax of 21*l.* 4s. per annum	650

August 14.—By C. VARLEY.

Stoke Newington.—93, Shakespeare-rd., f., r. 42*l.*	500
Hackney.—2, Pigwell-path, u.t. 81 yrs., g.r. 6*l.*	220

August 17.—By S. D. WALTON (at Congleton).

Smallwood, Cheshire.—"Yew Tree Farm," 70 a. 2 r. 30 p., f.	3,550
Two cottages at Brookhouse Green, f.	322

By HEFFER & SONS (at New Wortley).

New Wortley, Yorks.—23 and 23A, Wortley-lane, f.	198

August 19.—By MATTHEW MILES.

New Bond-st.—5, Clifford-st., with stabling, f., r. 505*l.*	11,400
Cavendish-sq.—56, Wimpole-st., u.t. 17 yrs., g.r. 80*l.*, r. 280*l.*	1,840
Harrow-on-Hill.—Byron Hill-rd.. f.g.r. of 3*l.*, reversion in 12 yrs.	320
Greenford, Middlesex.—"Rectory Cottage" and 2 r. 38 p., f., r. 30*l.*	390

By HENRY V. CHEW.

Walthamstow.—62, Erskine-rd., f., r. 26*l.*	28
Leytonstone.—Forest Glade, a plot of land, f.	228

(*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent, r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent yd. for yard, &c.

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G.	ton	£8/0/0 — 0/0/0
Teak, E.I.	load	10/10/0 — 15/10/0
Sequoia, U.S.ft.	cu	0/0 — 0/1
Ash, Canada	load	3/0/0 — 4/5/0
Birch, do.		3/15/0 — 5/0/0
Elm, do.		3/0/0 — 4/15/0
Fir, Dantsic, &c.		1/10/0 — 3/10/0
Oak, do.		2/15/0 — 3/15/0
Canada		5/5/0 — 6/15/0
Pine, Canada red		0/0/0 — 0/0/0
Do. Yellow		2/0/0 — 4/5/0
Lath, Dantsic, fath		4/10/0 — 5/10/0
St. Petersburg		5/0/0 — 6/10/0
Wainscot, Riga &c., log		2/5/0 — 4/10/0
Odessa, crown		2/5/0 — 4/10/0
Deals, Finland 2nd & 1st std	100	7/10/0 — 8/10/0
Do. 4th & 3rd		7/0/0 — 8/0/0
Do. Riga		7/0/0 — 8/0/0
St. Petersburg, 1st yellow		10/0/0 — 12/10/0
Do. 2nd yellow		8/0/0 — 10/10/0
Do. white		8/10/0 — 10/0/0
Swedish		7/0/0 — 15/10/0
White Sea		8/0/0 — 15/0/0
Canada, Pine 1st		22/10/0 — 93/0/0
Do. do. 2nd		15/10/0 — 16/10/0
Do. do. 3rd, &c.		8/0/0 — 10/10/0
Do. Spruce, 1st.		8/10/0 — 10/0/0
Do. do. 3rd and 2nd		7/0/0 — 8/0/0
New Brunswick		6/10/0 — 7/10/0
Battens, all kinds		5/0/0 — 10/0/0
Flooring boards, sq., 1 in. prep. 1st		9/10 — 14/0/0
Do. 2nd		5/6/0 — 11/0/0
Other qualities		0/4/6 — 0/6/0
Cedar, Cuba, ft.		/4½ — /5
Honduras, &c.		/4 — /5
Mahogany, Cuba		/4½ — /6
St. Domingo cargo av.		/4½ — 1/3
Mexican, do. do.		/4 — /5
Tobasco, do. do.		/3 — /7
Honduras, do.		/5 — /6½
Box, Turkey	ton	4/0/0 — 15/0/0
Rose, Rio		7/0/0 — 20/0/0
Bahia		6/0/0 — 15/0/0
Satin, St. Doming		0/0/7 — 0/1/0

TIMBER *(continued).*		
Satin, Porto Rico		0/0/7 — 0/1/8
Walnut, Italian		0/0/3 — 0/0/7
METALS.		
Iron—Pig, in Scotland	ton	2/5/5 — 2/6/3
Bar, Welsh, in London		5/15/0 — 5/17/6
Do. do. at works in Wales		5/10/0 — 5/12/6
Do. Staffordshire, in London		5/15/0 — 6/10/0
COPPER—British cake and ingot		48/10/0 — 50/10/0
Best selected		51/10/0 — 52/0/0
Sheets, strong		56/0/0 — 58/0/0
Chili bars		47/3/9 — 47/5/0
YELLOW M'TALB		0/0/4½ — 0/0/5½
LEAD—Pig, Spanish	ton	20/16/3 — 20/17/6
English com. brands		11/0/0 — 11/2/6
Sheet, English 6 lbs. per sq. ft. and upwards		11/15/0 — 0/0/0
Pipe		12/5/0 — 0/0/0
ZINC—English sheet	ton	20/10/0 — 0/0/0
Vieille Montagne		21/6/0 — 0/0/0
Spelter		17/5/0 — 17/10/0
TIN—Straits		59/10/0 — 60/6/3
Australian		60/7/6 — 61/5/0
English Ingots		63/0/0 — 64/0/0
Banca		61/0/0 — 61/10/0
Billiton		60/15/0 — 61/0/0
OILS.		
Linseed	ton	16/2/6 — 16/17/6
Cocoanut, Cochin		26/10/0 — 0/0/0
Do. Ceylon		23/0/0 — 0/0/0
Palm, Lagos		21/0/0 — 0/0/0
Rapeseed, English pale		25/0/0 — 25/10/0
Do. brown		23/10/0 — 24/0/0
Cottonseed ref.		15/10/0 — 16/10/0
Oleine		17/0/0 — 18/10/0
Lubricating U.S.		0/6/0 — 0/7/3
Do. black		0/4/9 — 0/5/6
TAR—Stockholm	barrel	15/6 — 1/0/0
Archangel		0/12/6 — 0/0/0
TURPENTINE—(American)	ton	18/10/0 — 0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated by the name and address of the sender: and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

ABERDEEN.—For the construction of pipe sewers, with manholes, Broomhill-road, &c., for the Town Council. Mr. Wm. Dyack, Burgh Surveyor, Town House, Aberdeen:—

Broomhill-Road.

Roderick McKay, Aberdeen £27 12 10

Hammerfield-Avenue.

Gall & Walker, Aberdeen £831 0 0

AMMANFORD.—For the erection of school buildings, for the Llandibie (U.D.) School Board. Mr. David Jenkins, architect, Llandilo:—

D. C. Jones	£2,489	Elias Morgan	£2,347
Thomas & Evans	2,470	Lewis Davies	2,305
Bennett Brothers	2,430	Griffith Mainwaring	2,250
Jones Bros., Ammanford*	2,350	David Rees†	2,195
Edgar Groom	2,348	Rowland & Lloyd	2,182

* Accepted. † Too late.

ASHINGTON (Northumberland).—For the erection of Primitive Methodist Sunday School buildings, New Hirst:—

J. N. Heatley	£632	15	Cocks Bros.	£570	16
J. McNeil	527	0	H. E. Willis, Amble, Northumberland*	539	10
Wm. Lilburn	586	13			
J. & H. Maughan	573	0			

* Accepted.

BARNES.—For the erection of six shops, fronting Church-road, for Mr. H. George Smallman. Messrs. F. & W. Stocker, architects, 90-92, Queen-street, E.C.:—

C. King	£6,260	0 0	H. C. Wills	£4,972	0 0
Cridlan & Co.	5,875	0 0	J. Edwards	4,892	0 0
H. J. Kerven	5,433	13 9	C. R. Gurr, 30, Cranbrook-road, Chiswick*	4,455	5 0
Johnson & Aldridge	5,220	0 0			
J. Watt	4,995	0 0			

* Accepted.

BOLTON.—For erecting two pavilions of workhouse infirmary, for the Guardians of Bolton Union. Messrs. Bradshaw & Gass, architects, 19, Silverwell-street, Bolton:—

D. & E. Maginnis, Bow-street, Bolton £10,247

BRADFORD.—Accepted for the erection of engine-house, &c., New Lane Mills, Laisterdyke. Mr. Thos. Barker, C.E., 5, Bond-street, Bradford:—

Masonry.—Chas. Booth & Son, Bradford	£3,860	0
Joinery.—Toothill & Balmforth, Bradford	282	0
Ironwork.—Roberts & Co., Bradford	139	15
Slating.—Hill & Nelson, Bradford	83	10
Plumbing.—C. Howroyd, Bradford	62	17
Plastering.—Chas. Howroyd & Son, Bradford	37	4
Painting.—G. J. Walton, Bradford	25	7
Travelling Crane.—J. Isles & Co., Stanningley	240	0

CHEWTON (Christchurch, Hants.).—For detached villa residence for Miss Elphinston. Messrs. Lawson & Donkin, architects and surveyors, Yelverton Chambers, Bournemouth. Quantities supplied:—

Hatwistle & Cox	£1,800	George & Harding	£1,565
Jones & Son	1,718	Frampton's Sons	1,500
Wm. Hoare	1,662	J. W. Lucas, Poole-road, Bournemouth, W.*	1,490
Jenkins & Sons	1,622		
McWilliam & Sons	1,588		

* Accepted.

CHURCH COPPENHALL (Cheshire).—For the erection of caretaker's residence, Mawfield Green School, for the School Board Mr. J. A. Atkinson, C.E., architect, 18, Hightown, Crewe:—

J. Amson	£930	T. Smith & Son, North-street, Coppenhall, near Crewe (accepted)	£818
J. Johnson	935		

CASTLEBAR (Ireland).—For the execution of waterworks, for the Union Guardians. Mr. C. Mulvany, M.Inst.C.E., Athlone:—

Works on Site.

Hodges & Sons	£4,465 0 10	George L. Johnstone	£3,367 10 2
Thos. J. Dixon	4,099 10 8	J. Galloway & Sons, Sligo*	3,353 6 8
John Cunningham	3,970 18 8		
Reade & Son	3,511 8 10		

Iron Pipes.

David Jones	£7,359 2 0	Watson, Gow, & Co.	£3,227 8 5
Stewart Bros.	5,763 14 6	John Shaw & Sons	3,174 10 7
Hickson Peet	3,648 2 3	Curtis & Sons	3,126 16 3
Wm. Baird & Son	3,546 1 10	Laidlaw & Sons	3,110 13 10
The Stanton Ironworks Co., Nottingham*	3,435 12 0	Maclaren & Co.	3,056 16 0
Biggs, Wall, & Co.	3,323 18 6	Macfarlane, Strang, & Co.	3,087 8 4

Waterworks Fittings.

The Glenfield Co.	£512 13 8	Frith Blakeley	£468 16 0
W. Baird & Son	509 5 0	Guest & Chrimes, Rotherham*	450 18 4
Biggs, Wall, & Co.	506 3 0		

* Accepted.

COLNE (Lancs.).—For paving several front and back streets; Bath-street, &c., for the Corporation. Mr. S. A. Pickering, Borough Surveyor, Town Hall, Colne:—

Thos. Horrocks, 123, Greenwich-rd., Walton, nr. Liverpool	£116 10 1	Bath-st.	
" "	143 6 5	Oxford-st.	
" "	289 19 9½	Granville-st.	
" "	257 14 8½	York-st.	
" "	272 11 3	Portland-st.	
" "	163 6 8½	Charles-st.	
" "	44 16 0	Back Richmond-st.	
" "	32 4 2	" York-st.	
" "	84 16 8	" Portland-st.	
" "	104 10 8	" Keighley-st.	
" "	66 5 2	" Charles-st.	
" "	71 9 7	" Gordon-st.	
J. & M. Hawley, Primet-hill, Colne	158 10 7	Clifford-st.	
" "	121 14 12	Salisbury-st.	
" "	94 8 10	Back Norfolk-st.	
" "	36 9 4	" Granville-st.	
" "	21 12 4	Leach-st.	

CRAWCROOK (Durham).—Accepted for the erection of school buildings, &c.:—

Masonry.—Davison & Bolam, John-street, Blaydon	£204 0
Joinery.—Davison & Bolam, John-street, Blaydon	220 0
Slating.—John Hewitson, Newcastle	51 0
Plumbing.—F. W. Jefferson, Ryton-on-Tyne	24 0
Painting and Glazing.—M. J. Rutter, Ryton-on-Tyne	10 10
Plastering.—Thos. Beveridge, Blaydon-on-Tyne	65 0
	574 10

CROYDON.—For building a new dining-room, and for alterations at the "Bricklayers Arms" Inn, for Walder & Collyers Brewery Co., Ltd. Mr. Robert M. Chart, architect and surveyor, Union Bank Chambers, Croydon:—

Winburn	£575	Hanscomb & Smith	£505
Bullock	562	Goulder	496

[All of Croydon.]

DENBURY (Devon).—For additions, &c., to farm buildings, Wotton Farm, for Mr. D. R. Scratton. Messrs. Rendell & Symons, F.S.I., surveyors, Newton Abbot. Quantities by surveyors:—

F. Irish	£735 19 5	J. H. Foaden	£550 0 0
L. Beanse	655 0 0	W. Atwill, Broadhempstone*	548 0 0
Hy. Doyer	628 0 0		

* Accepted.

DUNBRIDGE.—For additions to flour mills, near the railway station, for Mr. T. A. Aylward. Messrs. John Harding & Son, architects, 51, Canal, Salisbury:—

Vincent & Folland	£910	E. Hale, Salisbury*	£780
H. Hoskings	892	E. Witt	772
F. Beale	844	Webb & Co.	752

* Accepted.

EAST GRINSTEAD.—For the erection of isolation hospital and fencing, Highgrove, for the Urban District Council. Mr. W. W. Gale, C.E., Council Offices, East Grinstead:—

Cook & Co.	£3,502	Potter & Co.	£3,319
J. Morris	3,453	C. Rice	3,293
Ockenden & Sons	3,320	H. Young, East Grinstead*	3,277

*Accepted provisionally.

EAST STONEHOUSE (Devon).—For the erection of dwarf wall, laying out grounds, &c., for the Urban District Council. Mr. A. W. Denham, Surveyor, Town Hall, Stonehouse:—

Labour Only.

A. W. Coles	£245	E. Porter*	£195

[Both of Stonehouse.]

* This tender was accepted, but contractor having withdrawn, the Council are doing the work themselves.

ELMERS END.—For the erection of a factory, for Messrs. Muirhead & Co. Mr. Geo. Ashby Lean, architect, Palace Chambers, Westminster, S.W. Quantities by the architect:—

Symes & Duncan	£4,588	T. W. Jones	£3,902
L. H. & R. Roberts	4,397	T. Graham & Co.	3,390
Simmonds Bros.	4,383		

HALE END.—For erecting a new factory, for the British Xylonite Company, Limited, at Hale End, Walthamstow. Messrs. Searle & Hayes, architects, Ludgate-hill, E.C.:—

Lascelles	£9,575 11	M'Cormick	£7,967 0
Garrett	8,568 0	Higgs & Hill	7,949 0
Higgs	8,197 0	Dobson	7,447 0

HALSTEAD.—For alterations and new nave at St. Margaret's Church, Halstead, Kent, for the Vicar and Churchwardens. Messrs. St. Aubyn and Watling, architects:—

Philpot	£1,798 15	Otway	£849 0
Bond	885 0	Grist	659 0

HOVE (Sussex).—Accepted for road-making and other works, Fonthill-road:—

Holman & Co., Brighton £412

ILKLEY.—For the erection of a pair of semi-detached villa residences. Messrs. Isitt, Adkin, & Hill, architects, Prudential-buildings, Bradford:—

Masonry.—J. Brown, Ilkley	Total. £1,358 11s.
Joinery.—C. Murgatroyd, Idle	
Plumbing.—Hy. Lindley, Leeds	
Slating.—Jas. Smithies, Bradford	
Plastering.—A. Barker, Bradford	
Painting.—A. Higginbotham, Idle	

LONDON.—For building a house in Underhill-road, Dulwich, for Mr. G. B. Boxall. Mr. H. G. Brace, architect:—

Watson & Ellwood, Dulwich £783 10

[No competition.]

LONDON.—For rebuilding the "Coach and Horses" Inn, Broad-street, Lambeth, S.E., for Walder & Collyers Brewery Company, Limited. Mr. Robert M. Chart, architect and surveyor, Union Bank-chambers, Croydon:—

Rice & Sons	£1,551	Joselyne & Young	£1,134
Burges	1,325	E. Goulder	1,085

LONDON.—For proposed alterations to "Addison Hall, Addison-road, Kensington, W., for Mrs. Le Bas. Mr. J. Henry Richardson, architect, 170, Uxbridge-road, W. Quantities by Mr. T. Woodbridge Bigg's, 10, Clifford's Inn, Fleet-street, E.C.:—

Adamson & Sons	£1,693	Chamberlen Bros	£1,490
Kilby & Gayford	1,562	T. Nye (Exors. of the late)	1,490
W. Nash	1,500	G. Wimpey & Co.	1,447

LONDON.—For the erection of warehouse, offices, boiler house, and chimney shaft, at Riley-street, Bermondsey, S.E., for Messrs. Grant & Co. Mr. W. Seckham Witherington, architect, 33, Great Tower-street, E.C. Quantities by Mr. T. J. Fife, 2, Whittington-avenue, E.C.:—

W. G. Lake & Sons	£9,260	W. Smith	£8,383
Perry & Co.	8,558	Patman & Fotheringham	8,189
W. H. Lascelles & Co.	8,397	H. L. Holloway*	7,920

* Accepted.

LONDON.—Accepted for re-building front at 13, Lancashire-court, New Bond-street, W. Mr. Walter J. Ebbetts, architect, Savoy House, 115, Strand, W.C.:—

J. H. Scott £195

MANTON (Rutland).—For the construction of a brick bridge, Manton and Wing, for the Oakham and Uppingham District Councils. Mr. James Richardson, County Surveyor, 15, Barnhill, Stamford:—

G. C. Smith	£524 4 6	E. M. Dorman	£395 0 0
Tate & Co.	469 0 0	W. Dean	369 16 0
J. Nodston	412 0 0	S. F. Halliday, Stamford (accepted)	351 6 0
Joyce Bros.	405 0 0		

NEATH.—For the erection of public offices, &c., Orchard-street, for the Rural District Council. Mr. D. M. Davies, architect, 58, Water-street, Neath. Quantities supplied:—

Bennett Bros.	£2,220 0 0	W. Lissaman, jun.	£1,783 0 0
J. D. Williams	1,980 0 0	W. Bowers & Co.	1,755 10 0
Gustavus	1,976 19 9	D. Evans & Sons	1,699 6 3
D. C. Jones	1,929 0 0	D. W. Rosser	1,685 0 0
Walters & Johns	1,850 0 0	Thomas Watkins & Co., Swansea*	1,619 0 0
Henry Billings	1,830 0 0		
Evan Thomas	1,786 0 0		

* Accepted provisionally.

PLYMOUTH.—For proposed new premises, for the Three Towns Steam Carpet Beating Company, Limited, Plymouth. Mr Robert H. B. Neal, architect, Central Exchange, Plymouth. Quantities by the architect:—

Ambrose Andrews	£430	Wakeham Bros.	£390
Tozer & Son	419	W. E. Blake	388
A. R. Lethbridge & Son	417		
Wakeham Bros.*	£365 0 0	W. E. Blake*	£358 4 6

* Amended Tenders.

PONTRILAS (Wales).—Accepted for additions, &c., to National school buildings, Ewias Harold, for School Committee. Messrs. Nicholson & Hartree, architects, Hereford:—

William Vago, Ewias Harold £196

SHERBORNE (Dorset).—For the formation of proposed new road and sewer on the Field Walls Estate, for Mr. T. Durant Chandler. Messrs. Lawson & Donkin, surveyors, Yelverton Chambers, Bournemouth. Quantities supplied:—

R. R. Facey	£752 0 0	G. Troke, Winton	£598 0 0
Wainwright & Co.	698 12 0	Saunders & Co., Bournemouth*	£527 7 9
A. Bettes	599 3 4		

* Accepted.

STEVENAGE (Berks.).—For the supply of broken granite, for the Urban District Council:—

	Per ton. s. d.	Per ton. s. d.
E. J. Van Praagh & Co., 6, East India-avenue (accepted)	11 6	
Ellis & Everard	11 9	and 10 9
Narborough & Enderby Company	9 9	
Forest Rock Company	10 3	
Mountsorrell Company	11 3	and 9 9
Whitwick Company	10 4	
Croft Granite Company	10 1	
Enderby & Stony Stanton	10 4	
Grimley & Son	10 11	and 10 1
Paton & Son	12 0	
W. Griffiths	14 4	and 13 10
Griff Granite Quarry	10 3	
Fergusson & Starkey	10 4	
Fennings & Co.	14 6	

STOWMARKET.—For the erection of a bridge (Pickerel Bridge) over the River Gipping, for the Urban District Council. Mr. H. G. Bishop, architect, Market-place, Stowmarket. Quantities by the architect:—

R. Cooke & Co.	£855 0	H. Plummer	£674 0
F. Brett	835 0	G. Double	670 0
W. J. Botterill	790 0	E. Chenery	660 0
Andrews & Murray, Stowmarket*	679 15	R. Mulley	650 0
Death & Sons	675 0	A. G. Andrews	649 10

* Accepted.

WELLINGBOROUGH.—For the erection of three shops, &c., for the Irthlingborough Co-operative Society. Mr. J. R. Brown, architect, Irthlingborough. Quantities by the architect:—

E. Brown & Son	£1,461 10	T. Chapman	£1,360 0
Hacksleys Bros.	1,299 0	Coates & Son	1350 0
W. H. Lovell, Raunds*	1,315 0		

* Accepted.

WIMBLEDON.—For extension of shop, No. 31, the Broadway, Wimbledon, for Mr. John K. Skewes. Mr. R. J. Thomson, architect, 64, Hill-road, Wimbledon:—

H. Johnson £555

TO CORRESPONDENTS.

H. C. (amounts should have been stated).—G. W. F. (Below our limit).

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